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ABSTRACT

The twelve speeches and related panel discussions presented here were the major content of a meeting of professionals to identify future trends in sociology, economics, and education and to discuss these trends in light of future program purposes and direction of agriculture and agribusiness education. Titles and authors are as follows: (1) "Agricultural Trends, Issues, and New Directions in Iowa" by J. Merrill Anderson; (2) "General Technical Trends in Agriculture" by Keith C. Barrons; (3) "Trends, Problems, and Issues Ahead in World Food Production" by Glenn Burton; (4) Significant Scientific Trends, Issues, and Developments in America and the World" by Michael V. Nevitt; (5) "Agriculture and Youth in the Year 2000: Developmental Needs of Secondary and Postsecondary Youth" by Robert J. Havighurst; (6) "Changing Patterns in Vocational and Career Decision Making" by H.B. Gelatt; (7) "New Moralities and Old: A Reconsideration" by Paul Holmer; (8) "Labor Trends and Needs of Society During the Next Decade" by Rupert Evans; (9) "Economic Trends, Issues, and New Directions in America" by Dennis R. Starleaf, (10) "Social Trends, Issues, and New Directions in America and the World" by Douglas Ensminger; (11) "Contributions of Agricultural Business and Industries to State, National, and World Economics" by Harold Halcrow; and (12) "Trends, Issues and New Directions in American Education" by Ralph Tyler, (A summary of the forum containing outlines of the speeches and discussions is also available--CE 013 246.) (JT)

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ED147479

IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY

PROJECT 2000 FORUM
ADDRESSES AND INTERACTIONS

FOR
AGRICULTURAL EDUCATION
IN IOWA

DEPARTMENT OF

February 24 and 25, 1976

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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TABLE OF CONTENTS

Page
Purpose 1
Forum Participation 1
Project Staff 2
Advisory Committee 2
Project Consultants 2
Agricultural Education Staff, ISU 2
Speakers and Topics 3
Listening Panelist 4
Program 5
Presentations, Project 2000 Forum 9
- J. Merrill Anderson 10
- Keith C. Barrons 22
  - Interaction I: Anderson and Barrons 32
- Glenn W. Burton 42
- Michael V. Nevitt 52
  - Interaction II: Burton and Nevitt 65
- Robert J. Havighurst 78
- H. B. Gelatt 91
  - Interaction III: Havighurst and Gelatt 102
- Paul Homer 112
- Rupert Evans 121
  - Interaction IV: Holmer and Evans 129

Page
Dennis R. Starleaf 140

Douglas Ensminger 153

Interaction V: Starleaf and Ensminger 164

Harold Halcrow 172

Ralph W. Tyler 182

Interaction VI: Halcrow and Tyler 192

PURPOSE OF THE FORUM

The PROJECT 2000 FORUM was intended to be a meeting of professionals to identify future trends in sociology, economics, and education and to discuss these trends in light of future program purposes and direction of agriculture and agribusiness education.

There were three important components of the FORUM. First, twelve noted specialists in the fields of education, agriculture, developmental psychology, business, sociology, morality, and economics made presentations inspired by what they saw as prominent, future changes in their respective disciplines. Secondly, a listening panel of selected agricultural educators from across Iowa and the United States probed the specialists on those matters that were identified as important in agriculture and agribusiness education. Thirdly, there were round-table discussions and interactions by all specialists and listening panel members in order to place those identified trends in perspective to each other.

This review and analysis of current program purposes of agriculture and agribusiness education in terms of projected social, agricultural, cultural, economic, educational, and occupational changes resulted in a revised philosophical base, for the foundation of curriculum development in agriculture and agribusiness education.

This FORUM was but one phase of a U. S. Office of Education curriculum development project administered through the Department of Agricultural Education, Iowa State University.

FORUM PARTICIPATION

All sessions of this FORUM were open for public attendance, and there was no conference fee. However, all but official FORUM participants were required to absorb their own room and meal costs. Official FORUM participants included invited speakers, listening panel, Project 2000 staff, Iowa State Agricultural Education Staff, and the Project 2000 Advisory Committee.

Public participation in interaction discussions was limited during presentations, but any person was allowed to take an active part in the large group interaction sessions.

Presentations were of interest to secondary and post-secondary agricultural educators, university personnel in related disciplines, and state department of public instruction staffs, as well as other people who would be involved in the future of agriculture and agribusiness education.

Persons interested in attending the FORUM were asked to complete and return a pre-registration form, indicating those presentations that they desired to hear, and sessions they wished to attend.

PROJECT STAFF

Alan A. Kahler
James Leising
Tom Archer
John Magill

Conference Secretary,
Worth Haynes

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Ralph Tyler,
Chicago, Illinois

Gordon Swanson,
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David Williams
Clarence Bundy, Professor Emeritus
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James Leising
John Magill
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Clarence Bundy, Professor Emeritus

Harold Crawford, Iowa State University

Emeron Dettman, Department of Public Instruction

George Kizer, Iowa State University

Eleanore Kohlmann, Iowa State University

Anton Netusil, Iowa State University

Reginald Soldwish, South Hamilton Community High School

Joe White, Ellsworth Community College

AGRICULTURAL EDUCATION GRADUATE STUDENTS

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Mr. Neil Hernan
Mr. Jim Hilton
Mr. Martin Limbird
Mr. Mark Patton
Mr. Prince Preyer
Mr. Curt Schaub
Mr. Abdel Sharshar
Mr. Tom Silletto

THIRD PARTY EVALUATORS

Mr. Bill Klug
Mr. Harlan Giese

U. S. OFFICE OF EDUCATION

Mr. Les Thompson, Kansas City

SPEAKERS	TOPICAL AREAS
Mr. Merrill Anderson Central National Bank Des Moines, Iowa	"Agricultural Trends, Issues and New Directions in Iowa"
Dr. Keith Barrons Dow Chemical Corporation Midland, Michigan	"Advances and New Directions in Technical Agriculture"
Dr. Glen Burton USDA--ARAS Georgia Coastal Plain Experiment Station	"Trends, Problems, and Issues Ahead in in World Food Production"
Dr. Douglas Ensminger Department of Sociology University of Missouri	"Social Trends, Issues, and New Directions in America"
Dr. Rupert Evans Bureau of Educational Research University of Illinois	"Labor Trends and Needs of Society During the Next Decades"
Dr. H. B. Gelatt American Institute of Research Palo Alto, California	"Changing Patterns of Vocational and Career Decision Making"
Dr. Harold Halcrow Department of Economics University of Illinois	"Contributions of Agricultural Business and Industries to State, National, and World Economies"
Dr. Robert Havighurst Department of Education University of Chicago	"Changing Developmental Needs of Secondary and Post-Secondary Youth"
Dr. Paul Holmer, Head Yale Divinity School New Haven, Connecticut	"New Moralities and Old: A Reconsideration"
Dr. Michael Nevitt Argonne National Laboratories Argonne, Illinois	"Significant Scientific Trends, Issues, and Developments in America"
Dr. Dennis Starleaf Department of Economics Iowa State University	"Economic Trends, Issues, and New Directions in America"
Dr. Ralph Tyler Science Research Associates Chicago, Illinois	"Trends, Issues, and New Directions in American Education"

LISTENING PANELISTS

Dr. Ralph Bender, Head
Department of Agricultural Education
Ohio State University

Dr. Harold Crawford, Head
Department of Agricultural Education
Iowa State University

Mr. George Cummins, Instructor
Hawkeye Institute of Technology
Waterloo, Iowa

Mr. Harold Gamm
Des Moines Area Community College
Ankeny, Iowa

Mr. Ronald W. Jeffries
Florida Department of Education
Tallahassee, Florida

Mr. Steve Jorgensen
Vocational Agriculture Instructor
Rolfe, Iowa

Dr. Darrell Parks
Ohio Department of Education
Columbus, Ohio

Dr. Milo Peterson
Department of Agricultural Education
University of Minnesota

Dr. Richard Smith
State Department of Public Instruction
Des Moines, Iowa

Dr. Gordon Swanson
Department of Agricultural Education
University of Minnesota

Mr. Clifford Van Berkum
Vocational Agriculture Instructor
Swea City, Iowa

Listening Panel Chairman
Clarence E. Bundy
Department of Agricultural Education
Iowa State University

PROGRAM
Project 2000 Forum
for Agricultural Education in Iowa

Monday, February 23
Memorial Union

Afternoon
Arrival and check-in at the Memorial Union, Iowa State University

6:45 p.m.	Dinner	Oak Room
	Welcome	Dr. Harold Crawford, Head Agricultural Education Department Iowa State University
	Introductions and General Comments	Dr. Alan A. Kahler Project Director
	Announcements	Mr. Worth Haynes Forum Secretary
8:00 p.m.	Forum Orientation	
Room 201	Forum Speakers	Dr. Alan A. Kahler Project Director
Room 205	Listening Panel	Professor C. E. Bundy Chairman, Listening Panel

Tuesday, February 24
Scheman Continuing Education Building

Session 1
Mr. James Leising, Chairman
Iowa State University

8:00-8:40 a.m.	Agricultural Trends, Issues and New Directions in Iowa	Mr. Merrill Anderson Central National Bank Des Moines, Iowa
8:40-9:20	Advances and New Directions in Technical Agriculture	Dr. Keith Barrons Dow Chemical Corporation Midland, Michigan
9:20-9:50	Interaction--Listening Panel with above speakers	
9:50-10:10	Coffee Break	

Session 2

Mr. Joe White, Chairman
Ellsworth Community College

10:10-10:50	Trends, Problems, and Issues Ahead in World Food Production	Dr. Glenn Burton USDA--ARAS Georgia Coastal Plain Experiment Station
10:50-11:30	Significant Scientific Trends, Issues, and Developments in America	Dr. Michael Nevitt Argonne National Laboratory Argonne, Illinois
11:30-12:00	Interaction--Listening Panel with above speakers	
12:00-1:00 p.m.	Lunch	Rooms 204-208

Session 3

Mr. Tom Archer, Chairman
Iowa State University

1:00-1:40 p.m.	Changing Developmental Needs of Secondary and Post-Secondary Youth	Dr. Robert Havighurst College of Education University of Chicago
1:40-2:20	Changing Patterns of Vocational and Career Decision-Making	Dr. H. B. Gelatt American Institute of Research Palo Alto, California
2:20-2:50	Interaction--Listening Panel with above speakers	
2:50-3:10	Coffee Break	

Session 4

Mr. James Athen, Chairman
State Department of Public Instruction

3:10-3:50	New Moralities and Old: A Reconsideration	Dr. Paul Holmer Yale Divinity School New Haven, Connecticut
3:50-4:30	Labor Trends and Needs of Society During the Next Decades	Dr. Rupert Evans Bureau of Educational Research University of Illinois
4:30-5:00	Interaction--Listening Panel with above speakers	

Ames Country Club

Session 5
Dr. Harold Crawford, Chairman
Iowa State University

6:30 p.m.	Dinner
7:30	Total Interaction--Open to the Public

Group	Group Interaction Leaders	Group Interaction Secretaries
Group 1	David Williams, ISU	Lee Cole, ISU
Group 2	Thomas Hoerner, ISU	Gary Briers, ISU
Group 3	Emeron Dettman, DPI	Douglas Pals, ISU
Group 4	Bennie Byler, ISU	Jim Hilton, ISU

Wednesday, February 25
Scheman Continuing Education Building

Session 6
Mr. John Magill, Chairman
Iowa State University

8:00-8:40 a.m.	Economic Trends, Issues, and New Directions in America	Dr. Dennis Starleaf Department of Economics Iowa State University
8:40-9:20	Significant Social Trends, Issues, and New Directions in America	Dr. Douglas Ensminger Department of Sociology University of Missouri
9:20-9:50	Interaction--Listening Panel with above speakers	
9:50-10:10	Coffee Break	

Session 7
Dr. Eleanore Kohlmann, Chairman
Iowa State University

10:10-10:50	Contributions of Agricultural Business and Industry to State, National, and World Economies	Dr. Harold Halcrow Department of Economics University of Illinois
10:50-11:30	Trends, Issues, and New Directions in American Education	Dr. Ralph Tyler Science Research Associates Chicago, Illinois
11:30-12:00	Interaction--Listening Panel with above speakers	
12:00-1:10 p.m.	Lunch	Rooms 204-208

Session 8
Dr. Harold Crawford, Chairman
Iowa State University

1:15-3:15 p.m.	Speakers and Listening Panel Interaction	
3:15-3:30	Summary and Concluding Remarks	Dr. Alan Kahler Project Director
3:30-4:00	Work Session--Listening Panel	Room 254

Session 9
Prof. C. E. Bundy, Chairman
Iowa State University

Memorial Union

6:30 p.m.	Dinner and Discussion for Listening Panel Only	Regency Room
7:30	Work Session for Listening Panel	Room 205

Thursday, February 26
Scheman Continuing Education Building
Room 254

Session 10
Prof. C. E. Bundy, Chairman
Iowa State University

8:00-12:00	Listening Panel Work Session

Room 208

Session 11
Dr. Alan A. Kahler, Chairman
Iowa State University

12:00-1:00 p.m.	Lunch	
1:00	Listening Panel Report to Project Staff	Prof. C. E. Bundy, Chairman, Listening Panel
2:00	Adjourn	

PRESENTATIONS OF FORUM TOPICS

PROJECT 2000 FORUM

AGRICULTURAL TRENDS, ISSUES, AND NEW DIRECTIONS IN IOWA

J. Merrill Anderson

I approach you this morning with some apprehensions of being the first one on this program. I realize I am not the lead hitter. As I look over the program I see several very outstanding people within their respective fields who are going to address this seminar. I come here this morning merely to present to you some of my observations--not that I bring you any great wisdom or any answers to the problems that face Iowa and the nation as far as agriculture or the future of agriculture is concerned. I will only attempt to give you some of my observations.

First, I want to express appreciation to Dr. Kahler and Professor Bundy and all of the staff who have put together this most important conference. I know it will help give direction to the future agricultural curricula and programs, and help point out how these might be disseminated to the young people, of not only our state, but, I hope, the nation. Agriculture is a very important industry today. The importance of agriculture is in the headlines of the press throughout the world. It gains this recognition because we are the producers of food, and food is now very important throughout the entire world.

First, I will address the matter of agricultural trends. Trends do not come rapidly but gradually creep up on us. The most important trend I see today is the growing number of family operations. We hear a lot about the family farm, and how it is disappearing from the scene. I see the family farm as being extremely important. I see the development now of what I would like to call either formal or informal development of the family farm.

Let me refer to our own operation (and I may refer to this occasionally). We have what I call an "informal" type of operation, at least from an organizational standpoint. I treat "formal" as being an operation that has entered into some type of legal contract, where it is written out just how the farm is going to be handled for the benefit of those who are operating it and, more specifically, those who are in the family. This could be a farm that is incorporated, or it could be a farm that is operating under a type of partnership, but at least there is some legal direction.

Our operation is made up of myself, my son-in-law and a nephew. I call this a family operation. We have not formally incorporated. We have not written out anything, particularly as to how this partnership is to be operated. I would describe it as an informal general partnership.

As I work with farm families--not only today in the banking business, but also before as the head of an organization--I find many families with the sons and sons-in-law beginning to specialize. One member of the family is responsible for the agronomy practices, such as fertilizer, insecticides, herbicides, etc. He trains himself and specializes in that area. He is responsible for providing all the answers, projections and so forth in that specific operation pertaining to crop production. Another member of the family is responsible for the livestock operation. He attends meetings, reads, and feels the responsibility to report on new developments and methods of efficient livestock management to other members of the family.

Then there is usually the senior member of the operation. I fall into that category. In our operation, they look to me for the financial structure. I am supposed to have the good rapport with the banker. I am supposed to be knowledgeable about taxes. I am supposed to take care of the bookkeeping. I am supposed to keep the business in the black. We are having a conference for our operation today because my son-in-law heading the livestock enterprise feels that we need a new farrowing facility and a nursery. I have asked him to bring me cost projections and other details. We are trying to fit these facilities into the operation and calculate how much of a pay back we might expect. I see this trend of joint-managership developing in agriculture similar to what is done in business. In other words, three heads may function better than one. A single person cannot be an expert in everything. This means that the operation can expand in acres, and it involves more farms than it did in the past. When we add this up, we still have quite a few people involved in farming even though it may be under one family operation.

Another trend I see developing is an increase in cooperative marketing. I do not know of any subject that creates more interest, more discussion, or more inquisitiveness among farmers and producers than marketing concepts. Yet it is one that is extremely difficult to put a handle on. Almost every type of marketing has been tried. Yet the youthfulness of the young farmers still feels there has to be another way, that there is room for improvement. There are some things that could be added or some things that should be eliminated as far as the present marketing concepts are concerned. Today I would mention a few that are appearing. There is not anything really new about this, but there are some new approaches.

There are some cattle feedlot programs now, where farmers have joined together and employed a man who is a specialist in selling cattle or purchasing feeder cattle. He works for these producers and, in most cases, can combine from 12,000 to 20,000 head of cattle in a single transaction. He usually charges a fee of $2 or $3 per head for selling them. This provides the specialist with an adequate salary, at least to start with. His job is to bring to that operation possibly eight or ten potential buyers. His job is to maintain these contacts, whereas the individual farmer would have difficulty maintaining that many contacts and keeping abreast of the changes going on in the market.

The farmer-grain dealers association in Iowa is now working at bringing into the marketing picture what they call a "grain marketing pool." This is not a new concept. We have had pooling of grains, fruits and vegetables for years, but it has been done on a small scale. The associations are now attempting to set up a large pool where certain segments of their members crop would be marketed at various times of the year to take advantage of high seasonal prices.

We have other groups who are extremely interested in the export market. There are groups of farmers getting together to pool a very high quality product--one that they are proud of. They are marketing this direct, through containers that can be loaded on a ship and delivered to some customer in Europe, Japan or to another country. We have a few places in northern Iowa where edible soybeans are produced and these are loaded into containers with the purity and the quality retained, and sent to Japan for human consumption.

We have other groups who are attempting to put together small packages of feed grains to be sent to Europe and delivered directly to a feed mill or livestock producers in that area. These are some of the trends in marketing.

We have farm organizations that are actively engaged in this group marketing concept. The entire structure of the NFO is designed and built around a marketing concept--one that is not new, but one that has been very popular in years past. For example, when there were shipping associations in the local towns, if I had ten hogs to sell today I could pool them with someone else's hogs. These would all be loaded in a rail car and shipped to Chicago, Omaha, or Kansas City. The NFO has expanded this type of program. They have collection points where they pool the production of their members and then sell. They have also moved into some farm sales. This, I feel, is an extremely important area.

I wish that the answers were as simple to describe as the problems in the area of marketing. We have been very successful in this country, I think. We have a market system that absorbs everything that is produced at some price, regardless of quality. We have to realize that this kind of marketing system is important to agriculture.

A third area concerning trends is the expanded use of computers. At first this was confined to scientific, financial or industrial types of projections. Today we are discovering that the computers are becoming feasible and very profitable for evaluation of various agricultural projects and programs. Many of our farming practices; application rates of fertilizers, insecticides, herbicides; overall concepts of management; cash flow; as well as other variables could all be programmed. Your entire farm operation could be placed in a computer and the results you might expect could be predicted. I see the trend of using computerized farm record-keeping and the use of computers in making projections as to the method of operating or the profitability of a particular practice, as very important to the farmer.

Another trend I see today is that farming has now grown up and has become a business. It is less a way of life for farm operators. As I look back on my boyhood on the farm, I would say it was a "way of life." We had to get a lot of the daily needs and requirements for our family from the farm itself. My mother spent a lot of time cooking, canning, and preparing food for the winter to carry us through. We worked as a family unit. It was a "way of life." Today this is not the case. There is still a rapport, a family togetherness, but as far as the operation is concerned, it is strictly a business.

We are also finding that in our communities, particularly when close to a city or an urban area, that most of our farm homes are occupied. But that does not mean that they are farmers or farm employees. It means that many people who have lived in the city have moved out to occupy a vacant house on a farm. Some of these houses are not the best, and this is creating some problems in rural communities. It enters into tax problems and so forth, but at least we still have a community. As you drive through the countryside today, you cannot always determine whether a man is a farmer or not by the fact that he lives in a house on a farm. This creates a different social structure and social mix in the rural communities. This is a trend that I think will continue.

Then, of course, we have many people going to the country and buying that acre or two of wooded timber on the back forty of some farm and building a fine residence there, setting up their own domain. I think this trend also will continue.

Another trend I think we are going to have is a great deal of competition for land. We are going to have continued demand for land for urban expansion, recreational use, industrial growth, airports, and so forth which leads us to the topic of land use. This is a very important subject--one that we are not making very rapid progress with legislatively at the present time in our state. The Federal government is having some problems, too. The problem is, who is going to control who, and who is going to make the decisions at what level as far as land use is concerned. This involves many things, such as zoning problems and environmental questions that come along with land development.

Another trend I see, which as a producer and farmer I am certainly aware of, is the growing influence of consumers. "Consumerism," as many would call it, applies to and affects the agricultural industry. This happens in many ways. If you will think back over the last five years, consumerism has certainly affected the agricultural industry. Consumers are always concerned about prices. We have had food boycotts and all sorts of protests and movements. Some have gained considerable momentum, while others have failed. We have had the constant clamor by consumers to bring more controls to the agricultural industry. Their first reaction is "do something; pass a regulation; set up controls on the industry," not always recognizing what the result might be. Many times they approach this type of action with the idea that it is going to bring about cheaper food. That usually is not the case, and it usually ends up in a higher cost for food. We as farmers and producers must work closely with our Congressmen and Senators, our State Senators and State Representatives, because the consumer does outnumber us considerably. I would guess nationally that about four or five percent of the people are producers and ninety-five or ninety-six percent of the people are consumers. The odds are against us. It takes real know-how and influence to keep legislation on an even keel.

Along with this, we have had many problems relating to taxation. This is a very hot subject in our State Legislature. For those of you from out-of-state, we are having a lot of discussion and concern in this state about property taxes. Particularly, the increasing valuations that have been placed on residential and agricultural property which will bring considerable increases in taxes to the farmer and to the homeowner where a set millage is concerned.

We have been and are currently being confronted with the problem of imports. The consumer wants imports. The producer says, "We do not need imports--it destroys our market. We will produce for you." We have to recognize this conflict.

We also have this conflict on exports. The producer says, "Export my product so we can hold up the price and make it more profitable to produce food." The consumer says, "Drop the exports. I think it is creating a higher price for me." Let's get this thing in balance. As a producer, these are trends that I feel are not going to go away. They are probably going to continue to be very important influences on the future of my business as a farmer.

We have the influence today of the press. This is one that we need, as producers and farmers, to keep in mind. We have to cooperate with and understand the people writing about us and some of the problems that they encounter. We have young reporters today who are excellent. Their training is excellent, and they are smart. They have great talents as far as investigative procedures are concerned. They have a great ability to use words and they use them effectively. This is very fine, but they sometimes lack actual experience, or they lack the knowledge of being able to get down to the facts or get the other side of the picture. This sometimes can create problems for us, because they have the power through widespread circulation to present their views. Consumers with little background in a particular industry depend upon the information that comes from the press, the radio, and television. Quite often the facts are not always what they seem to be.

If you want an example, I can give you the following. We have had a great deal of discussion on the values of insecticides, pesticides, herbicides and other chemicals. The most recent action of this kind was the damage that might accrue to the pork industry when consumers read about the fact that nitrates and nitrites are cancer-causing. But very few writers have said anything about the fact that you would have to eat 46,000 pounds of bacon a day to be in danger. Many consumers are very concerned. I have met people in the Des Moines area who have read these articles and then asked me, "Is there this danger? Should I quit eating bacon?" This sort of thing can be very damaging to the pork industry.

I don't see any lessening of this kind of activity. I think we will have to be ready to meet it through our commodity and farm organizations, through actual experimentation, and getting facts from the universities and our research facilities. Then get it out to the public, even if we have to employ our own press people to write the articles so that we can bring the facts to the people.

Increasing land values are very much in the news today. Sale of land is often based on factors other than productivity. Many times land becomes available next to a farmer who has invested heavily in machinery. He needs additional land because his son or his son-in-law is now joining the operation. To help justify it to himself, he says, "This is the only chance in my lifetime that this farm will be available." So he adds it to his spread. We have many inputs that affect the decisions that come with the purchase of land, but as I mentioned, quite often the decision is not based on productivity. You can put the pencil to it and there is no way that you can, even with present prices, get this land to pay for itself, let alone bring a decent return to the owner.

What is actually happening is that he has a farm of a certain number of acres that he probably acquired many years ago at a very low price, or just purchased within the past ten or fifteen years at a very low price compared with those found today. What is happening as far as land purchasing is concerned is a cost averaging process. I do not know how long this can continue or how many generations can do this. But a man who bought a farm some years ago at four hundred dollars an acre and can buy the adjoining farm today for two thousand dollars an acre, will supposedly come up with an average cost for all his land. The banker looks at this and says, "You are safe. I cannot see that you are in any trouble. Go ahead and buy it."

Now the man who did not have a farm to help pay the two thousand dollars an acre enters into this business of farming on a completely different scale. If you have four hundred acres to start with at $400 per acre and you buy an eighty, you still have an opportunity to buy another eighty, and maybe another eighty before the total cost of the farm is in the $1200 to $1400 an acre bracket.

I think that one way this may change is if we have a few more farms offered for sale. That can cut the demand for land and the price, too. There are very few farms selling, and that makes it difficult to find a true market value for a farm today. So we are ending up with a lot of publicity about the millionaire farmers. In fact, we had an article on the front page of our leading newspaper in Iowa telling about these millionaires. I guess they are millionaires, but they have no cash flow. There is no way they can send us money unless they sell the farm. Sell the farm and they are out of farming and the other neighbor has taken over. We may find as we move into this older group of farmers that when they do sell out, taxes will kill them.

Now let me move into the area of agricultural issues. I think in the future agriculture will continue in the public eye because of consumers' concern about food production. They are concerned about the quality of the food they eat. They are concerned about prices and exports. They are certainly concerned about conservation and the environment. This will require greater emphasis on communications skills for farmers. These skills can also be utilized in dealing with top management, with bankers, and in making farm supply acquisitions for their operation. They will need these communication skills in the field of production and certainly in the field of marketing. I guess what I am saying here is we certainly need to be aware that today the man or the family out there on the land needs to be skilled in communication.

The second area of agricultural issues is the growing public dissatisfaction with many things that are happening on the farm. This winter we are hearing a lot about soil erosion by wind. There is a little dust in the air. It is important, and it is something that producers will certainly have to bring under control. We will have a great clamor for legislation to put restrictions on farmers. I think if farmers are able to communicate they will take care of some of these problems before there is a move toward some kind of regimentation.

Today, when most operators are about to build a confinement cattle or hog operation, they will probably be approached by someone with a petition to stop the construction. The petition has been signed by forty or fifty people, some they may never have heard of, from as far away as fifteen or eighteen miles. We have people who are dedicated now to the idea that we are not going to have this kind of thing happen in the community because of environmental, odor, and water problems. Most of them are not knowledgeable about anything other than that it is a popular thing to do to try to stop this kind of program or construction. The issue is a growing public dissatisfaction with many things that the farmer is trying to do today.

Then we have another issue that I think is of extreme importance to the future of agriculture. That is the exit and entry problem. In other words, how do you get into the business? And how does someone get out of the business? I see this becoming more difficult in the future rather than less difficult. The farmer certainly needs to be familiar with farm business, organizational structures mentioned earlier, and changing tax structures.

Another problem issue for the Iowa farmer to consider is this: Are we headed for an emphasis on crop production and a reduced emphasis on livestock production? We have heard a lot about this from the consuming sector of our country and the world. The World Food Conference geared for a thorough in-depth discussion of how we are going to use the food produced and how much easier it would be to feed people if we were not feeding grains to livestock. I do not see any lessening in this argument. I think it will continue to plague us. I think it brings us back to reality in Iowa. What does this mean?

I have some figures provided by the Iowa Development Commission. In 1969, cash farm receipts in Iowa from livestock accounted for seventy-five percent of the total, with crops accounting for twenty-five percent. In 1974, this structure changed to where cash receipts from livestock accounted for fifty-two percent and the crop receipts accounted for forty-eight percent. Part of this change is due to the change in price. I think there is a trend to think "why be in the livestock business?" We have alternatives in Iowa. We have the resources as far as land is concerned, to go heavily into cash grain operations.

Another issue is a continued influence on crop and other farm prices from world crop production and world economic conditions. We need to be familiar with these. The world is smaller now and we certainly need to know what is going on agriculturally in other countries.

Now I would like to discuss some agricultural issues that will continue in the future. We have many areas of inflation. The export policy and embargoes are also concerns that we have experienced in the last couple of years. There is a push now for Congress and other regulatory agencies in meeting clean air-clean water standards, making decisions on pesticide regulations, and using funds for agricultural research. I could spend considerable time on this last one. There are people who have said that there is no need for more research in agriculture and the funds should be spent in other areas. Yet today with the need for food I think research funding needs to be increased.

New directions in agriculture include an increasing importance of capital in farm operations. We need to be aware of and understand the size of operating expenses, cost of efficient-sized farms, confinement livestock operations, and inflated costs of land and farm machinery. I talked to a young man the other day whose annual interest bill alone was

$45,000. This takes some real management skill. He needs help.

We need to fully utilize crop residues to produce livestock. More emphasis is needed on management and marketing skills. There is a growing interest in basic marketing information.

We need to question something that has been argued in the press, on media shows, at churches, universities, and colleges. That is, should the U.S. use food as a bartering tool in international affairs? These are areas that the producer will be faced with in the future. If food is short, you know it is going to be a bartering tool. We have been trading weapons in the past. One of the reasons why the farmer is so involved is that the U.S. has had an abundance of food surpluses and the other countries looked to us for help. Now we are without those surpluses and the other countries have surpluses again. This puts a different light on the management decisions of our farms today.

Agriculture is, of course, Iowa's basic industry. I mentioned the pork industry earlier. More than 76,000 jobs in Iowa are provided by the state's pork industry alone.

We are going to need new directions in marketing, as I pointed out. I think these will be evolutionary rather than revolutionary. There are a lot of people trying to find the revolutionary change in marketing. It is not there. It will be an evolutionary change. We are going to need a higher information level for farmers. They seek cooperatives as a solution to marketing and purchasing. Cooperatives are recognizing that loyalty without service is a myth and I think cooperatives are beginning to do a great job in meeting the requirements and needs of their customers.

In the area of grain production, the grain industry is going to have to re-establish its integrity, as well as provide new services. We are going to have to take a good look at our grading standards and our marketing system, particularly those for exports.

As far as livestock is concerned, we have many new directions in animal health, marketing, merchandising, promotion, supply and demand, transportation, government regulations, environmental problems, imports and exports. All of these will affect the animal industry. I think the producers are accepting the challenges of change in the livestock industry.

The major influences on the future will be what the government is going to do to the marketing agencies. All farm organizations will need to step up their programs to keep pace with the producer and with the new image that I see coming in agriculture.

--Edited by Richard M. Foster
and John Magill

GENERAL TECHNICAL TRENDS IN AGRICULTURE

Keith C. Barrons

In a nutshell, my book, The Food in Your Future, is an attempt to explain to the non-technical, non-agricultural segment of the population (which after all is most of the population) why we have abundance, what the factors are that led to the abundance we have in the United States, and particularly, what we will have to do to continue to have abundance in the future.

Well, let's look back a bit. Most of us in this room have lived through a yield revolution. Considering crops as a whole, our average yields in the United States today are about twice what they were forty years ago. Corn, of course, is yielding about three times what it did forty years ago; potatoes three to four times as much; and soybean yields have significantly increased. This is truly a revolution if you consider that from the time we had our first meaningful census of agriculture, until about 1940, decade after decade, the corn yield rocked along at about 28 to 32 bushels per acre. As you know, we have hit 94 bushels per acre as a national average one year, and last year the yield was in the eighties. How did all this come about?

I think there are several factors in our yield revolution. I have divided them into five groups--first, genetic improvement, or our crop and livestock breeding programs; second, superior nutrition, both of plants and animals; third, better crop and livestock protection against pests, diseases, and other maladies; fourth, advances in management skills and practices; and fifth, one in which I think we are just at the threshold, controlled physiology of both animals and plants. Now I suspect that there are some technical advances that might not fall into one of these five groups, but I am going to put the ones I am going to talk about in them. Now let's look at each of them.

Breeding and Genetic Improvement In the old days we had to rely on selection of natural variants. Even today some of our important varieties of apples, for example, have come down through time. Decades ago, somebody may have discovered a seedling that happened to look good, so they propagated it. Then we began to learn, particularly in this century, how to induce more variation by hybridization. In the last thirty years we have made tremendous use of hybrid vigor by repeated hybridization to gain vigor factors from each parent. This is the basis of our hybrid corn industry which is so important to Iowa.

Now I think we are on the threshold of a new era in plant breeding, because we see possibilities of many new manipulative techniques to develop hybrids between widely divergent species. One that you probably have read about or had some experience with is triticale, a hybrid of wheat and rye. I think we are going to have more of this type of hybridization. Plant breeders are using such terminology as somatic hybridization; propagation of somatic mutations by cell culture; propagation of haploid lines of plants by actually using pollen in a test tube to grow a small callus and from that a full plant as a shortcut in developing pure lines; and the term "apomixis" which is probably familiar to Dr. Burton but perhaps not to the rest of you.

Of course, the animal breeders are beginning to think, rather wildly at times, about new techniques such as embryo implantation. All these things are very highly specialized. Today's farmer is not going to be able to participate in this genetic engineering, but he should be aware of it. He should be aware of the potential that there is for improved varieties, breeds, and hybrids.

Nutrition Here, I think, is an area that the practicing farmer has got to be knowledgeable about. He has got to really be a nutritionist. Whether he is a crops man or a livestock man, he has got to understand what factors influence effective and desirable nutrition of his crops and his livestock. If you are a poultry grower, you can probably be satisfied knowing that the technology is in the minds and the hands of the people who formulate your feed. If you are a hog grower, and particularly a cattle grower, that is not enough, because you have got to make some on-the-spot, on-the-job decisions on feeding programs. You have got to combine economics with good scientific and nutritional knowledge. If you are a crops man you have to make on-the-spot decisions on the technical needs for the common elements N, P, and K, that is, the optimum levels that may pay off at given crop prices and given fertilizer prices.

There are many other new aspects of nutrition. New technologies are on the horizon which I think the farmer of the future is going to have to understand if he is going to optimize his productivity and his profits. Minor element deficiencies are going to become more common. We have the choice of straight mineral substances or the organic chelated substances. In your neighboring state of Nebraska, zinc deficiency in corn is an example of a minor element deficiency that has turned up. These things usually show up after a few years of farming. Sometimes because of mismanagement or because of fertilizer practices that have been undertaken. Another example is the excess copper that developed in Florida citrus, which makes it difficult for the citrus trees to utilize iron. This had to be corrected with an iron chelate. Such things as coated fertilizers to ration nitrogen through desirable growth periods are coming to the fore, as well as others that you are going to hear more about in the future.

One that my company has participated in and, in fact, I am proud to say we have been a leader in it, has been nitrification control. It is one I think you are going to hear of in the near future. As you well know, when you apply ammonia fertilizer (which is insoluble in water), it does not leach readily, and it very quickly nitrifies through the action of bacteria to form nitrates. As a nitrate, it is very leachable. In conditions of heavy irrigation you always risk losing some nitrates, which is not only costly in these days of high fertilizer prices, but also has some adverse ecological effects. Under conditions of heavy rainfall many parts of the country can possibly lose nitrates. We now have a technique for reducing or minimizing this loss by inhibiting the growth of the Nitrosomonas bacteria that convert the ammonia to nitrite and on to nitrate. We can then hold the ammonia there long enough for the plant to take it up. This is in the very early commercial development stage. I think this will be important in the future, especially in areas of heavy rainfall and lighter soils, where there may be loss of nitrogen. Such losses cause a depression in yields and waste of fertilizer that you have paid good money for. It also has a tendency to increase nitrate levels of ground and surface waters.

When we come to livestock nutrition, if we are satisfied with conventional feeds and do not consider economics seriously, we can work out standardized programs to follow year after year. But here, too, I think we are going to have to plug in economics because of the ever-changing costs of production materials. Particularly in cattle operations, tomorrow's farmer, if he is smart and if he is going to make a profit, is going to have to give more consideration to pasture improvement. After all, land costs (as Mr. Anderson mentioned and as we all know) have gone up and if you have bought fencing lately, you know how that has gone up. We have just got to produce more pounds of beef or more pounds of milk from a given piece of land through pasture improvement.

Dr. Burton, your next speaker, is a leader in this field in the South, particularly in connection with improved grasses. Just improved grasses alone are not the entire answer. We have to look to the mineral nutrition of the plant. We have to look at the fertilizer and liming necessary to grow the plant. One I am particularly conscious of is the look we have to give to the competing plants. The woody plants that are often non-nutritious, sometimes even poisonous, certainly are not very palatable. Grass and woody plants for the most part just do not go very well together. We have got to look at such things and do a better job of improving our pastures.

There are new technologies and improvements being developed. An example is inhibiting the native vegetation while you get the grassland seeded with improved grass mixtures. In the future the cattle farmer or the land owner who ignores these technologies just does not have a very good chance at surviving.

Then, I think, as Mr. Anderson mentioned, we are going to have to give thought to better utilization of farm products. There is a great deal of research going on at the present time, such as caustic treatment of straws and treatments of cellulosic materials. After all, the plant first synthesizes sugar and from these building blocks it makes cellulose. Isn't there a practical way to reverse that chemical process and again end up with digestible carbohydrates of sugars from the cellulose? Now the ruminant animal does this pretty well. The bacteria growing in the rumen synthesize certain enzymes, primarily cellulase, which breaks down the cellulose to sugars. Can we help the animal? Can we help the rumen bacteria? Caustic treatment of wastes is one approach.

There is another research area in which a number of people are working.

I have a half-dozen colleagues in my company who were telling me just the other day about some progress that is rather fascinating. The story goes back (to show you how there is dovetailing and integration of different kinds of research) to Natick, Massachusetts, where the U.S. Army for years has had a project aimed at finding ways to preserve cotton fibers. Being in the industrial anti-microbial business, Dow had supplied them with preservatives at one time or another for trials. Of course, the trouble with most preservatives of cotton fibers is that when you wash your clothes you lose the preservative. But in the process of these studies, they identified some strains of fungi which were very very efficient in breaking down cotton fibers. If these fungi could break down cotton fibers, they could act similarly on wood fibers or cellulosic fibers. So now there is considerable research effort going on at producing cellulase enzyme using one of the fungi. That cellulase enzyme can be used to actually convert wood fiber and straw back to sugar. In fact, I have seen some small bottles of syrup made from straw and one made from old newspapers. But we are not interested in that. We can produce sugar for human consumption in a more practical way. But I think the ruminant animal would be interested, if we could at least partially convert that cellulose back to sugar, or partially carry it back to the point where the enzymes in the rumen could act more readily on it with greater digestibility.

Pest and Disease Control Livestock protection and crop protection have become far more important to us in recent years. We have to go back only a little over a hundred years to the great Irish potato famine. The fungus that causes that late blight on potatoes (phytophthora infestans) struck in the years 1845 and 1846. In fact, when I was a kid I actually knew an elderly lady who was eight or ten years old when her family managed to get across the Atlantic to escape the famine. I remember her telling some stories about it. The potato famine was not very long ago in terms of human history.

Some gentleman in France, allegedly attempting to protect his grapes from the boys who wanted to steal them, sprayed some copper sulfate (blue vitrol) on his vines and discovered that the blight which ordinarily attacked the leaves of the grapes did not develop. From that, we derived Bourdeaux mixture, which for many, many decades was the primary fungicide used to control the potato blight and certain other diseases.

In the 1930's we began to develop some new organic materials to help control these diseases--compounds that derived their fungicidal, fungistatic action not from toxic elements like copper, but from a specific molecular configuration. You have all lived in the day when you have seen a great many useful and active insecticides, herbicides, and other pesticides introduced. There have been so many it almost makes one's head swim to try to keep up with just what is currently available, what the uses of these chemicals are, where they fit, and how they can best be used.

We have learned recently that some classes of materials and some specific compounds that were introduced without the great amount of pretesting that is undertaken today are leaving the market. Possibly not always based on any scientific reason, but because of some of the intricacies of our food and drug laws. In the future, I see the continuing introduction, at a slower pace, I am sure, of materials, but I think the ones that are introduced in the future by law will have to receive better pre-testing for safety. They are going to be more adequately tested in advance of introduction for utility and for market potential, for the very simple economic reason that the cost of doing all the research for bringing a new product to market is so great, that you just have to be a little more certain that it is going to make the grade and that it is going to have a meaningful place in the market.

I suspect we are going to have more specificity. For example, one pesticide that I am familiar with because my company was involved with it is Pictran miticide. It is now one of the leading miticides in the world. It is very specific, not just for mites but it can also be used in integrated control programs. It will control or reduce parasitic mites while it actually is not too hard on the perdicious mites. A dosage of one and a half or two ounces per hundred gallons of spray is a very active material for parasitic mites and a very inactive material for insects and even some of the desirable mites. To utilize the specific materials one has to be a little more knowledgeable. The users do not have to have all the technology at their fingertips but they have to know where to get it, how to interpret it, and how to use it.

We are certainly having a great deal more emphasis on ecologically safe materials, partly because of the law and partly because it is just plain good business to introduce products that can stay with you for several years and not fall into disrepute because of some previously undetected side effect.

In my book, I refer to target hittings with pesticides. There has been tremendous progress made with pesticides. The public does not know about it but you people do. The book was written for those in cities who do not know what is going on on farms. For example, back rubbers for lice on cattle. We don't have to spray cattle any more. Or, the pour-on treatment for cattle grub. We did not have a good control for grubs until recent years, but this new scheme of just pouring the pesticide on the target is a rather unique and effective one. The dog flea collar, which you probably use on your pet, is one target-hitting pesticidal treatment that the public is familiar with.

We are going to have more of these target-hitting treatments in modified-dosage forms. For example, the new dosage form for worm control in sheep and cattle will not be the old drench where there was always the risk of the dose syringe injuring the throat of the animal, but merely the swallowing of a paste. Just a little squirt of the paste in the throat and the animal does not spit it out. The animal swallows it and gets its medicine that way.

We have tremendous research underway, particularly in the fungi control area. New approaches to diagnosis will enable farmers to minimize the amount of material they have to use and the number of applications, and to apply it at the right time. This is on the horizon, but it has had some success and I think it might work in major potato-growing areas. By proper programming of the computer, that is, data on temperature, humidity, rainfall, spore load, and other factors, we can predict just when the sprayer should be cranked up. Should it be today or tomorrow? I suspect every orchardist and everyone having to use large amounts of costly fungicides has had the question in mind, "Should I start spraying today for apple scab or cherry leaf spot or shall I wait till tomorrow?" Spraying before it is really needed or spraying a day late is costly and usually not too effective. I suspect the banana companies, who use millions and millions of pounds of dithyiocarbanic fungicides for the cycatoka disease (leaf spot), have advanced their diagnosis and their decision-making on just when to spray perhaps a little further than anyone else. For an individual farmer, this service is going to have to be provided by the government or somebody else. The farmer has to understand it in order to make use of it.

Management or Husbandry Practices I suspect that when you mention husbandry practices or management practices, most of us think of the huge equipment that we have today. Labor-saving equipment has been a very important thing to us in our recent economy. I suspect in the future, energy-saving methods are going to be even more important. After all, there is a limit to how big you can make farm equipment. I suspect we are in many cases, approaching the size limit now, depending on the size of farms. But we have to remember that energy-saving is just going to have to be a part of our thinking.

Now some progress has been made in developing minimum tillage techniques and even some zero-tillage techniques. Tillage techniques are going to continue to advance. They do require a little more depth of technical knowledge than many farmers have had. Again, an individual or even three members of a team such as Mr. Anderson mentioned, can hardly have all this technology at their fingertips. The important thing is to have some fundamentals, know that there are opportunities, know where sources of information are, know how to get it, have the incentive and the impetus to go get it, make interpretations as they apply to one's own farm, and finally move ahead.

I think soil conservation technology is going to advance. We are certainly not making use of all of the technology that we have on hand. That is true in all the areas of technology. But from the standpoint of improved management and improved husbandry practices, I think we are going to have to maximize our use of soil conservation methods, for the public's benefit as well as the individual farmer's benefit.

Physiology Control of physiology in livestock and crops is still on the horizon for the most part. Diethylstilbesterol (DES) is one you are familiar with for improving the growth of livestock and cattle. Whether or not this remains with us, because of the intricacies of our food and drug law, is not clear. Incidentally, as you are probably aware, it has been found that only in a modest number (say, ten percent) of the animals fed diethylstilbesterol can one identify any DES in the animal and that is found only in the liver. In order for a human female to reach her normal secretion of this type of hormone she would have to eat about 150 pounds of liver a day. That is, eating only the liver that contained any at all! We have many people working on other types of physiology regulators with livestock, not only for improving growth, but for controlling estrus for batch farrowing. These things are on the horizon, and the real smart livestock grower is going to be familiar enough with them that he can understand the reports that come out on new technology and make use of them.

Plant growth regulators are here in some instances. For example, ethrol is used for increasing the flow of latex in rubber. Some other materials have been developed for increasing the storage of sucrose or sugar in the sugar-cane stem. There are a number of horticultural uses of growth regulators for our major crops. They have not yet become highly important, but I think they will.

It has been found in recent years that some kinds of plants that we have known as high-yielding (corn and sugar-cane) have a little different kind of physiology than most other plants. All plants carry on respiration, that is, loss of oxidation of carbohydrates, around the clock. Why do they respire as rapidly as they do? This happens not only at night but in the daylight when photosynthesis is going on. If you have photosynthesis going on this fast and respiration this fast, both day and night, then it is only the difference that fixes carbon and stores the carbon in some form in your plant. There is tremendous work going on right now by plant breeders looking at possibilities of modifying the physiology of some plants so that they will store carbon more efficiently. A number of physiologists are looking at the possibility of specific chemicals modifying the physiology of plants by reducing the amount of respiration that goes on.

I suspect that this will come to fruition some day and that growers will be able to take advantage of it. From the standpoint of the state of Iowa, I suspect that this technology, if it could work out, could have tremendous impact on the yield of soybeans.

In conclusion, I think all these things have to be integrated. We had a lot of good technology before 1940, but it was applied often in bits and pieces. Perhaps somebody had a real high-yielding variety, but he did not fertilize it very well. Or perhaps he nourished his plant properly, but some disease or some insect took an undue toll. It was really when we began to put all this together as a system that we began to make all these tremendous advances in yields.

Again, I do not think any one individual can master the technology he needs. It seems to me the real challenge for education of the future is to do a sharper job of teaching students the fundamentals. We also need to provide instruction on how to find new information that is available and how to interpret it. And finally, we need to teach students how to plug in the economic considerations that have to be taken into account in deciding just what information to use, when to use it, and how to use it.

--Edited by Richard M. Foster and
John Magill

INTERACTION I: J. Merrill Anderson and Keith Barrons

Listening Panelist: Could you give us some illustrations from your own experience and observations of transfer of equity gradually over a period of time from a fellow who is about ready to think about retiring to a son or another young person or a couple--and some of what happens and some of the pros and cons of this kind of transfer?

Anderson: I will attempt to. This is not an exact science today, particularly with inflated land prices. Let us start out with the first problem--the exit. In Iowa today, we have a high percentage of farmers who started shortly after WWII and within the next five to ten years these men are going to be retiring. They have been in this inflated era. The exit is difficult from the standpoint of taxation; that is, the present taxation that we have, the exemptions and so forth--as far as death and transfers to the widow. We know the women are living longer than the men, so there is a pretty good chance that she is going to end up paying the taxes and have to make some disposition of the farm.

There are people who are now trying to project under our present inheritance law what the costs are going to be for this exit--in the case of death, for example. The cost is enormous and it means that some method of financing must take place--further mortgaging of the land or some part of the land has to be sold in order to make this exit. So we start with this premise. Now we say that the son or son-in-law or two sons or three sons are trying to move into this operation. We can have a very disturbing element interjected as to how we make this transition. Attorneys, insurance companies, and congressmen are all addressing themselves to how this could be accomplished.

Of course, we are hearing a lot about deferred taxation programs whereby the widow would have ten or fifteen years in order to meet this tax obligation that might come out of the earnings of this land so it could be retained for the family and keep this family operation moving.

There are other systems. There is the matter of incorporation--Chapter S corporation--and many farm families are moving in that direction. This means that all the income from the operation has to be distributed to the shareholders. That is one method.

The regular corporation, some attorneys are saying now, provides a better system if it is a sizeable operation and part of the profits can be left within the corporation. This means then that the exit can be made by using gifts and presenting them to each one of the members of the family over a period of years. Of course, you can start with the original amount and then I think it is three thousand dollars each per year thereafter. This, of course, can be distributed to the sons and daughters who might be in some other occupation and not living in the community, so there is a gradual transition. Those remaining on the farm can begin to repurchase these shares from brothers or sisters or aunts or uncles or whoever it might be. To date this is about all. There may be other methods but outright sale to a son ahead of time, five or ten years before Dad is ready to retire, gives the son a chance to get into the business at a lower price. Ten years later (if we continue inflation) we know it may be higher.

It is not easy and I think presents some real problems in the future as far as exit and entry into agriculture.

Listening Panelist: I would like to hitchhike there a little if I might... you made the statement that we are moving into more family farm operations, both "formal" and "informal." The word "informal" bothered me a little bit because from what you just said you need to have a pretty formal understanding and I think, particularly with the relationships that are involved, that has to be in writing for clarity. Could you explain that word "informal"?

Anderson: "Informal," I guess, is without any kind of plan--where it grows up like Topsy. I have had many young farmers come to me in the past and say, "How do I get some understanding with Dad? I'm out there in the business. I just came back from the university, and I assumed that Dad--you know, I had good intentions and Dad did, but he really wanted me as a laborer. He hasn't told me yet just when I am going to take over, or how I am going to take over. If I am going to stay in this operation, I want to advance, put in a farrowing unit or a cattle finishing unit or expand the crop production. Every time I bring up the subject (and I'm quoting young farmers, now) Dad says, 'Well, son, you know you've got a brother down in Illinois and a sister out in Colorado and I've spent about all the money I'm going to spend on this operation because I have to justify to them that expenditure. I guess I made it this far and you'll just have to do the best you can.'" That says, informally, that Dad has to die before the son knows what his future is going to be. He (the son) says, "If that's my future, I want to get out of it." That upsets me.

Listening Panelist: Dr. Barrons, we know that there is always lag in the use of research but we hear that the lag is becoming much less now. How close up do you think farmers are or how can agriculturalists use the research that is being developed right now? Has that lag narrowed considerably?

Barrons: I suspect it has and yet you see some technology not being used that is kind of old. Maybe it's natural that we are all more interested in the brand-new things than in some that have been around for a while. Certainly our communications are better than they used to be and we have more avenues of communications. Of course, the farmers that have not been alert to new approaches for the most part are phased out of business. We have many fewer farmers than we had thirty or forty years ago and the ones that were less inclined to be alert to new technology, I think, on the average, have been those that have sold out or turned over their operation.

Listening Panelist: I also conclude from your remarks as well as Merrill Anderson's that there is really no place for the generalist any more now that everything is so specialized. This means that we in education circles had better be training specialists. Is there no place for generalists at all?

Barrons: It seems to me that in one sense a farmer has to be a generalist because there are so many technologies and so many business aspects to his job. The point I tried to make is he just cannot be enough of a specialist to be on top of all the technology that he needs to use. He needs to know enough about it to go get the information when he needs it. Now, this is pretty tough. In fact, today's farmer who is making a go of it is a remarkable guy in my book, because he has to combine business acumen with ability to use so much technology.

Listening Panelist: I would like to direct a question to Mr. Anderson. It goes back to the exit-entry problem. It also goes back to the generalist versus the specialist, and it goes back historically to the kind of program that we have known in vocational agriculture since its inception. That has been that we have focused primarily on training the manager-operator type of individual—the person who goes out and assumes the managership of a business or enterprise whether he is the owner or renter or whatever the case might be. He makes critical decisions. If we are in an era where it is extremely difficult to enter into farming per se--production agriculture--as a manager because of capital expense or whatever, what do you see in terms of the emphasis that we would have in a curriculum? Should we continue to train the manager-operator type of individual? Should we start to look at specialization in terms of training equipment operators who can handle the sophisticated farm equipment and go out and become an employee of a business? Should we train the livestock worker who understands the mechanics of dealing with livestock from the standpoint of manipulating but not making key management decisions, in terms of buying, marketing...what do you see here?

Anderson: I think that a man still needs a general overall education. In concept, specialization will come later. I guess maybe we need to be looking at the post-secondary--the area community college, the two-year farm op course. Unless he has decided after some type of education to get a broad picture, then I think his own personal interests and desires may lead into this specialization. The equipment operator and so forth ...if he has decided at the sophomore level in high school that this is his interest, if he is mechanically inclined, he is probably going to fit in the grain operation--basically the operation of large equipment. He will be efficient and he hopes that some day he will move out of that operator category and into more of the management category. I cannot say just how this will work. I think it is difficult at a young age to say to a young man, "You must decide today whether you are going to be a livestock man or a grain man or a machine man to fit into this picture."

We do, I think, have a great opportunity in the agricultural education field--especially at the high school level, with the adult farmer evening program. This has been a great method of bringing this specialization to the men--along with the university field days and so forth. He begins to develop his skills in a certain area. Sometimes this will provide opportunities. Many farmers today do not have the son there, the son-in-law is not there, there are no sons or sons-in-law. He has to make this transition (exit) out of farming. I think there are opportunities for some of these young men that you are describing to begin to fit in and work for this man as an employee. He may start as sort of a general employee, but as he develops and the owner begins to exit, he can assume more responsibility. The new man begins to come into the operation gradually. I think if we can, we should provide him with the educational opportunity to get into the area of specialization.

I think, again, as Dr. Barrons pointed out, we can't know all of these things. We will have to know where the sources are. We are going to get a lot of this specialized help through our commercial dealers--our Dow chemical products, our salesmen, technicians, field men, through the cooperatives, our marketing agencies, and so forth. We depend more and more on these businesses to provide us with a specific specialist. I can call on four or five men when I go out today--one is in livestock and one is in crops and one is in chemicals and one is in fertilizers and so forth. I accept from him the information that he presents to me. Then I become a specialist after he has spent two or three hours with me on my farm. I am a specialist because I bought his product and after I purchased it, then I am going to follow his instructions.

Listening Panelist: Could either of you gentlemen respond, particularly you, Merrill, since you are familiar with the vo-ag program in the state of Iowa. Most of us are in one-man departments. With all this information, all these specialists that we are going to need, what do you foresee in the next fifty years as far as the vo-ag instructor in the state of Iowa? Are we going to need more men to meet the needs of these specialists, or are we still going to have the one-man ag department?

Anderson: I think you will probably have several men in the department. None of them may be the real specialist as you might think of a specialist today. I think the specialist will be with the company, with the university, or will be in some area of research and then we have to figure out some way of getting the communications set up again.

Barrons: I don't know that I have anything particularly pertinent, but the vo-ag teacher certainly can't hope to have all this information either. But, again, you can somehow give students experience in tracing down information that they may need on a given subject. I have very limited teaching experience but I have done considerable teaching on my present job with industrial farmers, with new people, and frankly, I am a little bit appalled sometimes. Sometimes people with Ph.D.'s do not quite know how to get out information--in their case probably technical information from technical literature. It seems to me that across the board, education has been a little deficient in this sort of thing. We have tried to provide instruction about information-gathering by maybe assigning a term paper. If it reads good to us, we give them a good grade without too much thought as to the depth or the approach that they have taken and getting at the information they needed. For example, if the question is about crop attrition. Say the crop has not done as well as it might have. Well, what literature is available on the various minor element deficiencies? If it is good literature with pictures and so forth you can begin to match up your symptoms with the pictures and sources of information from the universities and so on. There is no one set source of information on a technical question or a technical problem, but I think students across the board, whether it is vo-ag or college or even graduate students, need to develop a little more savvy of how to get to the meat of the question or how to get the answer.

Listening Panelist: Let me elaborate on that just a bit. I have often felt that in most of our high school programs we have tried to teach kids too much. So basically what you are saying is, if we can get them to make a wise decision with the information they have got, then after we get this far, what do you see for the area school programs? Are we going to expand on these?

Anderson: I would say "yes." I am still a firm believer that there are fundamentals that we still need to consider. I am not familiar with the curriculum in the schools to know exactly what you are teaching today, but I view it now from my standpoint and from my own operation. My son-in-law, for example, comes into our operation with an Ag Business degree from Iowa State. One of the first things we assigned him was a cost analysis. We wanted to know where we were wasting money, where we can save money, to evaluate the operation. Well, we think he is qualified for this because he had considerable accounting here at the University in the Ag Business curriculum. I think accounting is extremely important today. Now where you start teaching this, should be in the vo-ag department so that this young man can read financial statements, so he can read a certified public accountant's evaluation of the business. He may suddenly become a director of his own cooperative. He is thrown into this and he has to make other decisions besides just his own farm. He needs this kind of basic, fundamental background. I do not know whether we are teaching this or not. This may be specialization, but I think this is going to be important in the future. You cannot guess when banks are going to demand profit and loss statements, and bottom-line figures, and appreciation and depreciation and all of these things. When I see some of the demands coming into our institution now for desire for capital--larger than some of our retail businesses--the first thing the directors ask is, "Where is the audit on this man? Does he have a CPA?" You go out and talk to a fellow about this and he does not understand it at all. He says, "I got a bookkeeping system and I got my expenses and my income and enough for tax purposes, but I didn't know..." So I think fundamentals are still important. We can get hung up a little on the area of specialization. I think specialization is sort of a self-education and he will have to go and find it at the night schools, the area community college, the university, field days and this kind of thing.

Listening Panelist: What percentage of the beginning farmers would you say are getting established in farming through their own family, home-farm basis or help from family?

Anderson: Well, this is just an observation. I would say it would be a high percentage and a high percentage of them are college graduates. I think Dean Kolmer said some time back that thirty or forty percent of the ag graduates are going back to farming. The economy, the price, the income possibilities are all open. It has been a great attraction.

Listening Panelist: The public sort of reacts to the Capone incident about like they do to the movie "Jaws." How do you restore public confidence in this? Dr. Barron, you mentioned the abundance. You walk into a supermarket. How do you convince the people that this abundance is in no small part due to use of pesticides and herbicides?

Barrons: Well, it is pretty difficult. Really, it is difficult to reach the public and I would like to put in a little plea for all of us doing what we can to do just that. After all, our food system is a very delicately balanced proposition. Very few people recognize all the things that go into converting a bag of wheat seed one year to bread on the supermarket shelf the next year. I think it is important that they do understand it because, after all, our laws and regulations are promulgated by Congress, the regulators, and these are in turn responsible for the people. And who are the people? Ninety-five percent of them have little knowledge of farming. Of course, there is another considerable segment of the population that serve the farmer in one way or another or help convert our raw agricultural commodities to food on the shelf. But they really have little understanding of what it takes to produce the basic foods. I think we should all do what we can to explain this. I might mention one book you might like to read. I thought of it earlier when another question was asked. It's called Panic in the Pantry by Dr. Stare of Harvard and Elizabeth Whelan, both very capable, competent nutritionists. It attempts to bring some sense to all the scare stories that you read about this material or that material. I read a rather amusing little column the other day by one of the satirists who write columns. Somebody had decided to apply for a grant from the National Cancer Foundation to make a study to discover something that did not cause cancer. The question was, "Well, what are you going to start with?" He was going to start with apricot yogurt. Why apricot yogurt? Well, there is a factory in Yugoslavia where they made a lot of yogurt and they had apricots in the area so they specialized in apricot yogurt, and there were lots of mice in the place and none of them had ever had cancer! (Laughter) Didn't say whether the cat had anything to do with this or not!

Listening Panelist: Both speakers alluded to this soil erosion problem. Is the problem because farmers do not know? Is it an education problem? Or is it because they don't care? Is it something that has to be legislative or does there have to be some profit potential pointed out?

Barrons: I would like to defend the American farmer because particularly in the East and the Southeast we have made some tremendous advances in the last thirty or forty years. I spent three years on the staff at Auburn University in Alabama. Gosh, the old worn-out eroded cotton-corn fields I remember down there, producing maybe fifteen or twenty bushels per acre. Now that is permanent pasture and pine forests. Mr. Burton can probably tell you more about it, but we have been here in the Great Plains where we have not had the acute erosion problems. Maybe we have not been as knowledgeable or as concerned as we should have been. I really can't answer your question but I wanted to make that comment because I think the American farmer really has done a remarkable job, especially if you will look at all the windbreaks that have been established and the over two million farm ponds that have been built and the other things that have been done for conservation. There is a lot to do yet, of course, but I think this open winter probably brings the question forward. It is a good time to stop and think about it and decide what to do and how to do it.

Listening Panelist: What about the place of the innovators and the early adopters? Will they be the ones to remain on the farm and the others just "weed themselves out" through the financial end?

Barrons: I guess there has been a trend in that direction, hasn't there?

Listening Panelist: Well, these adopters and the laggards--(as the sociologists would call these men) there is just no place for them--they just can't make a go of it.

Listening Panelist: I have a question for Mr. Anderson. You were talking about specialization within the family farms. I was wondering what your opinions were as far as large corporate farming, because when you talk about consumerism it sounds like that could restrict the family farm due to legislation and tax structures, maybe pressure on food prices, and increasing land values. It looks like with the exit-entry problem, it might be easier for large corporations to buy into some of this expensive land. I just wondered if you see the large corporations coming into play in agriculture?

Anderson: I think there is a threat of many things, but I think one of the handicaps or problems that the large corporation has at the present time is trying to employ the kind of management and effort it takes in order to actually compete with the family farm. If they decide to put the capital into land and they get tax benefits from that, then I think this could become a very serious problem. From the management standpoint of specialization, I guess there are degrees of specialization. What is more, I think the family adopts and assigns responsibility and maybe that is what I should have said...he is responsible for certain areas of production on that farm. I think it tends to bring him into more of a specialist category. This does not mean that he will not have a vote, so to speak, as to which herbicides are going to be used and so forth. There are going to be family board meetings, so we are going to come out with the most efficient, least cost and most effective and this kind of thing. But he will be researching and bringing this information to the family that he thinks is important. You know, "We are going to use DES" or "We're not going to use DES. Now we're going to use Rumensin," or something of this kind. He thinks it will be effective and the protein supplement cost will be $12 per ton more but it is going to be more efficient and so forth. He will bring those decisions and have great input. I think as you tend to get larger in the farming business and have more volume, then it becomes more needful as far as an operation is concerned.

-- Edited by Richard M. Foster

TRENDS, PROBLEMS, AND ISSUES AHEAD IN WORLD FOOD PRODUCTION*

Dr. Glenn Burton

Forecasting the future is not new. Man was reading the signs to try to predict the future when the first pages of history were written. He still does. And if he is right often enough, he makes the headlines. If not, his credibility as a forecaster very quietly slips away.

Hunger is not new. History describes more than one nation in which the people died in a very short period of time because of famine. Hunger is not new. Why then should we be so concerned at this time about hunger and world food production?

I am going to try to answer some of those questions in the next few moments and to help me do it, I am going to project some of my notes onto the screen. I am going to do this because a couple of my educator friends tell me that most of what I know, I learned through my eyes. They tell me I can remember about twenty percent of what I hear and thirty percent of what I see. Maybe this will help you to remember what I am going to be talking about.

Lee and DeVore, who spent a good many years studying this subject, tell us that man was a hunter-gatherer ninety-nine percent of the time that he has been on earth. They say he ate well, had a great variety of foods and worked less than a twenty-hour week. World population during this period probably was no more than ten million. Lee and DeVore also tell us, as far as they can ascertain, there was never any great famine during this period of time. Jack Harlan calls this "Man's Golden Age."

Why should we be concerned about this food problem? Well, it is primarily because of the population explosion. It is not so much a food problem as it is a population problem. I have tried to present a picture of this population explosion on the abbreviated table that you see here:

Time	World Population
Beginning to 1830	1 billion
1830 to 1930	2 billion
1930 to 1960	3 billion
1960 to 1975	4 billion
1975 to 1985	5 billion
1985 to 2010	8 billion

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*Made in conjunction with a slide presentation

It took from the beginning of time when man appeared on this earth, probably two million years ago, until 1830 to accumulate the first billion people; a hundred years to add the second; thirty years to add the third; and only fifteen years to get us where we are today with a population of 4 billion. Demographers tell us we will most certainly have five billion people to feed in just ten more years, by 1985. The say if the population continues to increase at its present rate that we will have at least 6 to 6.5 billion by the year 2000, and it is going to increase to 8 billion by the year 2010.

Why this population explosion all of a sudden? There are a number of explanations, and we can find an example of one of these in India. It is a rather sad paradox, that in India they had a stable population from 1900 to 1920 because half of the babies died. We introduced modern medicine in order to save the babies and the population increased 110 million in just the ten year period from 1961 until 1971. That is half as many people as we have in the United States.

What about the population growth rate? In the developing countries, it has increased from 2% per year in 1950 to 2.5% in 1970. These are the hungry nations. In the developed countries, growth rates have declined to less than one percent per year. The developing nations, with 70% of the world's people, account for 86% of the world's population increase. That is where the problem lies.

R. I. Jackson of the Food and Agriculture Organization of the United Nations (FAO) tells us, "In a world organized for the full use of technology and the proper sharing of effort, there would be no danger of running out of food either this year or this century." I believe that, but let me read that sentence again so you thoroughly understand what he said. "In a world organized for the full use of technology and proper sharing of effort (we don't have it), there would be no danger of running out of food in this year or this century." However, he says, "In the real world in which we live, running out of food is a recurrent danger." That is the reason we are concerned, and for very good reason.

They tell us the four billion people in the world today have twenty percent more food per person on the average than the 2.7 billion people had twenty years ago. Why our concern? Why are there millions of people in the world today who are hungry and always have been? There are a number of reasons. Let's look at some of them. First is the amount of grain we consume.

Grain Consumption Per Capita

	USA	India
Direct Consumption	120 lbs	400 lbs
Indirect Consumption (through meat)	1146 lbs	0 lbs
Total	1266 lbs	400 lbs

You see by the table that we in the United States consume 1266 pounds of grain per capita, compared with 400 pounds in India. Why? Because we can enjoy meat and meat-products. We consume 1146 pounds of grain on the average per person because we are able to enjoy meat products.

Affluence is contributing greatly to this world food problem. It commands agricultural resources. It increases the consumption of livestock products. It indirectly competes with grain consumption. It increases food costs per capita. I was amazed when I traveled in Japan in 1974 to see acres that had been occupied in rice in 1963 lying idle because Japan has a surplus of rice. A surplus of rice because Japan's affluence has caused people to quit eating rice and to substitute meat instead.

Malnutrition is largely the result of poverty. More than two out of three people in the world live in countries with average annual incomes of $200 per person or less. Nation-wide poverty is largely the result of low productivity. If I had time I would like to expand on some of these points.

I believe, however, that inflation is causing more hunger and more malnutrition in the world than lack of food per se. Let me explain by giving you an illustration. I was in India last April as a consultant. While I was there, I spent two days with an agricultural missionary. He told me that just a year ago the villagers he knew had barely enough to eat. He said, "The cost of food has gone up 50%, while salaries have increased hardly at all." He said, "I don't know how they are eating, because I haven't got the nerve to ask them." Inflation is one of the terrible things in the developing and hungry nations of the world.

The developed nations can not feed the world. About ninety percent of the world's food is eaten in the countries where it is produced. I have underlined the words "can not." I want you to look at them. When somebody suggests that the American farmer could feed the world if you would just give him a chance, tell them they don't know what they are talking about. It could not be done. We export a lot of our rice. We could double our rice production and give it all away--and we'd increase the amount of rice that people consume in the world less than two percent. We in the United States can not feed the world. Don't let folks tell you we can.

The world's grain production in developed countries and developing countries warrants a better study. In 1970 the land area occupied was essentially the same in these two groups of countries. There had been no increase in developed countries like our own. The Less Developed Countries (LDC) had increased their acreage by 32%. The average grain yield in our country was 2.1 tons per hectare. The developing countries produced 1.2 tons per hectare. I wish I could explain the reasons for the differences, but I can't because I don't have time.

During the twenty-year period from 1954-73, average yield per hectare increased 63% in the developed countries and only 32% in the LDC's. Thus, developed countries such as the U.S. now produce two-thirds of the world's food. But if we look at the increase in total production for the past twenty-five years, the LDC's had worked at it harder than we had. They had increased their own production by 78% as compared with 64% for the developed countries. They are working at the job, and we should give them credit for their efforts. Total feed-food production from 1954 to 1973 in the developing countries expanded 75%. In the developed countries it expanded only 65%. But the significant fact is that food production per person during that same period in the developing countries increased only 8%, while in the developed countries, it increased 33%. The difference was population growth.

A number of factors affect the food supply; land, seed, fertilizer, pesticides, yield-increasing technology, weather and climate, and incentives. Let's look at those in a little greater depth. The atmospheric scientists tell us that the present day climate is much warmer than the average of the past several centuries. They say a return of the earth to cooler conditions is a realistic expectation over the long run. They also say that advance knowledge of long-term future changes of climate is not yet available. If the climate gets colder, the problem will be accentuated, we know.

What about the Green Revolution? I want to say to you that it has been the reason that millions of people are alive today who otherwise would have starved to death. What is the Green Revolution anyway? Well, it is high-yielding varieties, with the proper amounts and kinds of fertilizer, with improved management, with pesticides to protect them, with irrigation and other water control to insure the crops. When you have all those inputs together in the right way, in the right production package, you can do tremendous things. And they did this in Mexico, when from 1948 until 1970, they doubled the yield of wheat in ten years and quadrupled the yields in twenty years.

But the Green Revolution hasn't accomplished what we thought it could accomplish. Primarily because, by 1969, only 12% of these high-yield variety farmers were following all the recommendations. I think it is safe to say in many, many instances, it was not their fault.

We will talk about that in just a moment. Let's have a couple of illustrations of this Green Revolution. Keith Barrons already referred to the remarkable Green Revolution in corn production in the United States. It started right here in the state of Iowa in 1933. It took you ten years finally to get most of your acreage planted in hyrid corn. And then you had to do a lot of other things as well, to finally triple the corn yield for the nation as a whole. But it is tremendous evidence of what technology can do when put into practice.

You are looking at pearl millet, a forage crop in the United States, but a grain crop occupying some 40 million acres outside the United States. It is planted on land close to the desert, because pearl millet is a crop that can produce grain where no other crop can produce grain. We have been working with pearl millet since 1936. In 1956, we were successful in discovering cytoplasmic mass sterility, making hybrid millet possible. In 1961 we made seed of the inbred lines that we had developed, that we knew were outstanding, available to Indian breeders together with suggestions on how they might develop hybrid millet. Two years later, in 1963, I was in India and took the picture that you see here. Ordinary, open-pollinated millet on the left, and a new hybrid, a cross between our Tift 23A, our male sterile, and a line developed by the man you see in the picture. The hybrid had yielded in later tests, and in that year as well, twice as much as the open-pollinated varieties they were growing in India at that time. Add to this the other inputs that can go along with the Green Revolution and they were able to increase yields, in some cases as much as ten times. When I was in India in 1969, the head of this Indian Millet Improvement Program told me that hybrid millet was responsible for twenty percent of the increased food production that was associated with the Green Revolution in India. This is an indication of what the Green Revolution can do when it has a chance.

To produce more food on an acre of land, farmers need a number of production materials. They need good seed from high-yielding varieties--this has been a major bottleneck. They need more fertilizer--a tremendous bottleneck in much of the world today with high prices for oil, the base for nitrogen fertilizer. They need water control--irrigation, flood control, drainage. They need better cultural methods. They need pest control. And they need them all together at one time in the right proportions. They need multiple cropping systems such as we saw in China in the summer of 1974. They need more know-how--better education. This is where you folks come in. They need price incentives and financial credit. Governments must insure an adequate supply of inputs, seed, fertilizer, pesticides; the things that it takes to make the Green Revolution successful. They must provide incentives, and they must provide credit. Governments are people serving their own people. Governments must either invest some of their resources in supplying the inputs for the Green Revolution or they will waste much more of their resources trying to quell Red Revolutions.

Grass cereals supply 75% of man's energy and over 50% of man's protein. But cereals lack protein and are usually deficient in one or more of the essential amino acids. We now know that all the food constituents in cereals are under genetic control. A single gene, opaque-2, was just a curiosity for many, many years. Yet it doubles lysine and tryptophan content in corn and makes it almost a balanced ration for people. The floury-2 gene doubles the amount of lysine and increases methionine fifty percent in corn. Hyproly, a gene discovered in barley from Ethiopia, confers high protein and high lysine content in barley. We could go on enumerating these. We are looking for more of them.

Here at Iowa State University, Ken Frey and some of his graduate students have transferred genes by introgression from wild oats to cultivated oats in order to increase yields 25 to 30%. Now that is twice as much as conventional plant breeding was able to increase oat yields in the past sixty years. In addition, they have improved grain protein content to make it a better food for man; improved straw protein content so we can feed better quality straw to our animals; raised grain oil content 12%; and provided resistance to five diseases. With this new method of breeding, they have set a pattern that we must follow with every one of our food crops in the years ahead, if we are to meet the food needs of the world.

Just recently the University of Nebraska released an amazing new variety of hard red winter wheat called Lancota. It contains ten to twenty percent more protein than the wheats now being grown. It has high yield potential, good disease resistance, excellent milling qualities, and excellent baking qualities. More significantly--it could produce one hundred million pounds more protein per year in the state of Nebraska alone, if the acres now grown in other varieties were planted to Lancota wheat. The world needs more protein. Can you think of a cheaper or a more effective way of increasing an essential food product in the world? I can't. I hope you read the last of it, indicating who did it and why. You are looking at some people admiring Lancota wheat for various reasons and I want to emphasize again that it was cooperative effort between the USDA and Nebraska. Three men working together as a team--and twenty years of hard work that we call research. That is what it will take, but I believe it can be done.

The hungry nations must plant more acres and they must produce more food per acre. There is no other way they can avoid famine. This they must, somehow, be made to realize. The hungry nations need better food storage, and better food distribution. That is another paradox. There have been famines in some states in India when there were food surpluses in other states. Famines because there was no adequate means of distributing food from a state of surplus to the state of famine.

When I was in China, I was impressed with the programs that Chairman Mao Tse-Tung had produced. He forced his people to study two nights a week. He placed slogans before them on big red signs wherever they went. Some of the simplest of those slogans were "Store More Food," and "Store Food Everywhere." Store food everywhere, and we saw some of this. The world needs to do this, and they should not expect the U.S. to do it for them. We can't. But it is pretty hard to store food when your production is barely adequate to feed your people. This is one of our problems. The developed nations must continue to supply food to help avert famine due to drought, floods, and so forth. But we should supply food only to the hungry when there are acute shortages. And we must do this I think for a number of reasons.

It may interest you to know that the U.S. has supplied eighty percent of all the food aid that has been supplied to developing countries in recent years. Since 1924, this has amounted to $25 billion worth of food. That is a lot of food, but it is a rather small amount when you consider the amount of munitions we have given to various nations to blast mankind into oblivion. Such massive food aid can only be temporary help. We should not forget that. I think it would be well if we could all remember that we help people most when we help them help themselves.

I have a missionary friend working in Lima, Peru. I had a letter from him the other day and he was telling me some of the problems he has been encountering. He said, "...you know, we have given the people down here too much. They have become dependent on us and if we don't have just exactly what they need, they are greatly distressed. We have done more harm than good with much of our giving." And he ended his letter with this question. "How can we help people without hurting them?" How can we help people without hurting them? "You can give a man a bowl of rice and he can eat today. Teach him how to grow rice and he can eat the rest of his life." Thank the Chinese for that one, too.

Lowering agricultural trade barriers offers one of the best ways to enhance world food security. We need to do this, even though it may cost us a bit of money on the way. Our Economic Research Service and our Foreign Agricultural Service says the technology to produce enough food for four billion more people in 25 to 30 years with present diets is not on the books. I agree. And for this reason we must accelerate our agricultural research.

Let me give you just one example of something we have done in our laboratory in the field just recently. It's the kind of thing that I think could come out of this kind of research. We are looking at two leaves of pearl millet that are identical genetically, except for one gene that takes the barbs off the leaf on the left. You can see the barbs on the edge of the leaf. There are no hairs there, either. We assumed when we did this, that we would make that slick-leafed millet more palatable and more acceptable to livestock. And that was true. When we put out a cafeteria test, with 18 different varieties replicated 12 times randomly, then turned a bunch of cows in and let them eat free choice, they found the twelve plots of the slick millet here on the left and pulled the leaves off in just a little bit. They liked it better. We could hardly believe how well they could find those plants. That's the hairy plant, just like it genetically, except for the hairs on the right.

Well, this was quite exciting. But we found out some other things that we didn't expect. We found that when we took those barbs off that we ended up with a better cuticle. A better skin to better protect the leaf. So last summer we did a very simple little experiment. We went out and harvested leaves of a slick plant and a hairy plant. We put them in test tubes, filled the test tubes full of water and placed them in an air-conditioned room and left them for 48 hours. We lost only this much water from a slick leaf and lost nearly tice as much from the hairy leaf. Now what does this mean? An awful lot of the hungry people are living in arid sections of the world, where water is the number one limiting factor. If this development will increase drought tolerance and food production, and we believe it will, it can make a tremendouse difference in the kind of food we can produce, how much we can produce and when we can produce it in arid parts of the world.

This is just one example of the kind of research that must be increase. It is going to take more research and it is going to take much more agricultural education. I can not overemphasize the fact that we really haven't got the Green Revolution sold in most of the world, primarily because we have not had the right kind of education to get it done. And I am delighted that you are addressing yourselves to that problem here.

In the last analysis, I would remind us that either man limit population before it is conceived or famine will limit it afterwards. And teaching that truth, I believe, is the greatest challenge that faces the world today.

--Edited by Richard M. Foster

SIGNIFICANT SCIENTIFIC TRENDS, ISSUES AND DEVELOPMENTS IN AMERICA AND THE WORLD

Michael V. Nevitt

You should know ahead of time that these are the views of a scientist who has spent most of his professional career, as the chairman has just said, totally outside of agriculture. I have spent most of my time at a large national laboratory performing and, more recently, directing basic materials research on metals, ceramics, and liquids, primarily in the interests of the U.S. Atomic Energy Commission. As I think all of you know, the U.S. Atomic Energy Commission was dissolved a year ago in January and has now been supplanted by the U.S. Energy Research and Development Administration. We at Argonne Laboratory have a very full range of responsibilities for civilian energy options including solar, geothermal, and fossil, as well as the one that serves most of our prior objectives under the AEC, nuclear energy.

It should be obvious to you that this presentation isn't going to contribute very much in a really direct way to charting a future course in education associated with agriculture. In fact, I'm willing to accept the possibility that you will think some of my views are pretty narrow and parochial. Perhaps they are, considering I have spent most of my time in the physical sciences, and not in the life sciences. If there is any value here, it lies in some thoughts about two broad future trends in science, as they are seen in a large energy and research development laboratory having many different kinds of scientific responsibilities.

I think one of these trends is largely cultural, therefore, you might consider it "non-scientific," while the other trend is perhaps more traditional and analytical and, I guess, "scientific." I thought as I decided how to present this that I could give you a talk on some of the hard technology of energy research. I could have told you what Argonne is doing in the area of solar, geothermal, nuclear, and fusion energy. But looking at the title of the topic I was to address, I really felt that the trends in science, the issues that science faces, are really not so much technological and scientific, per se. I think that a couple of speakers this morning have already introduced this concept. Many of the trends in science are forces exterior to science. I think some of the changes in the scientific level and in the style of science are going to result from these exterior forces.

I thought I would talk to you about two trends that I can state fairly easily, but then have a little more difficulty defining them in their full dimensions. Here are these trends: Science will be engaged in an increasing number of cultural encounters with other segments of society--and these encounters will influence the style and the role of science. Some people have told me that my term "cultural encounter" is kind of a euphimism, and, having coined that myself in trying to educate the public on nuclear power, I agree to that. In fact, "confrontation" might sometimes be a better word than cultural encounter, but I think I chose that for a purpose.

The second trend I want to talk about is stated this way: The traditional reductionist analysis approach in science--that is, choosing simple problems and simple models with a small number of controllable variables (that has been a tradition in science)--is going to have to share in the future in partnership with an approach that deals with more multivariable systems in an integrated way. Stated another way, this time-honored, so-called scientific method probably is not enough. I would like to develop that for a minute.

Those trends are in a way more philosophical than scientific and technical. The first of them I stated was: Science will have numerous cultural encounters and the influence of these will be profound on the style and the role of science. I think this is a fairly recent trend. It offers a rather striking contrast to an earlier, and somewhat dichotomous situation when science was kind of a community apart. It was usually respected, occasionally feared, but rarely communicated with in any real way and almost never challenged by the rest of society. Some people have said that Western science has in recent times been an aloof science. That it has been rather inward-looking and self-contained. In fact, it has recently been observed that, "It is difficult to be a member of the scientific establishment without being its prisoner."

I guess if you wanted a distilled statement of the scientific laissez faire that has been the tradition certainly in the physical sciences for fifty years or so, it is the following one. I don't know how many of you know about Abraham Flexner. Flexner was by training, I think, a geneticist. In the 'thirties, he was one of the prime movers in establishing the Rockefeller Foundation. He was also an important force in creating the Princeton Institute for Advanced Studies. When they opened the Princeton Institute, he gave a talk on science and made the following statements: "Scientific knowledge develops autonomously. It is uninfluenced by social needs or events." He said, too, "Science moves mainly by unexpected discoveries made by accident." Parenthetically, let me say that many people have enunciated on the Serendipity Theory--that is, the discovery of things that are not the object of search. Flexner was essentially saying that science is a serendipitous type of operation.

I like that. In fact, I know in my own laboratory that serendipity does influence a lot of our findings and our progress. But I also want to point out to you what Louis Pasteur once said, maybe not a direct response, or a direct comment on serendipity as such, but to the subject. Pasteur said very simply, "Chance favors the prepared mind."

Flexner ended his Princeton talk by saying, "...scientists should be unconcerned with external matters in selecting their problems...and there is not outside direction needed in problem selection."

Well, midway, I have chosen an extremist view, almost a caricature of pure science. I think there has been an attitude of this sort in the scientific community. The result of this attitude is that Western culture, as we know it, is ambivalent toward science. There is an admiration of accomplishments sometimes mixed with awe, as I have said, but the public simply is not stimulated to understand science. Scientists are not always considered to be stimulating members of the intellectual community.

Parenthetically, let me say that in earlier times scientists probably tried harder to communicate. I would like to just quote for you what was incorporated in the founding chapter of the British Royal Society in 1667. "We resolve to reject all the amplifications, digressions, and the like, and speak in the language of artisans, countrymen, and merchants, rather than in the language of wits and scholars." I don't know what your scientific and technical literature is like these days, but if it is as full of jargon as ours is, you would believe that that statement ought to appear on the masthead of many technical journals. The statement is still applicable today.

Scientists do communicate poorly, if at all, with the public. The mass media have not been any help. So there is a need for change, or at least a lot of people think there has been. While I have said this was a new trend, I think there have been some scientific spokesmen who have addressed this at least five or six years ago. Willie DeBoese, as most of you know, is an articulate and excellent spokesman for the life sciences. In 1970 he said, "Social contraints on the scientific enterprise are inevitable, because science now impinges, with increasing effectiveness and sometimes violence, on all aspects of human life."

Now Willie DeBoese is a soft scientist. Now let me turn to someone who is more a colleague of mine--a hard scientist. This is Alvin Landberg. Alvin Landberg, as perhaps you know, is now the director for Energy Study at Oakridge, Tennessee, and was formerly the laboratory director at Oakridge National Laboratory which is essentially our sister laboratory. Alvin Landberg said, around 1970, "It is not tenable to base our scientific judgement entirely on internal criteria. Society will not support sciences as enchanting diversions."

So we might say then, it has taken about half a decade for some of these early predictions and admonitions to take some kind of public political form. I guess until recently there has been a rather skeptical response from the scientific community at large. In fact, you probably have read comments that sound maybe a little pontifical although they were made in good faith. Scientists saying, "...only the specialist has the knowledge to decide what we should be doing. Only the scientist himself can choose."

Well, things are changing. I think scientists such as myself who are associated with nuclear energy, particularly the technology of nuclear energy, can describe some recent interchanges with public and activist groups. They are, indeed, better described as "confrontations" than as "cultural encounters."

Whatever we call them, they have been fractious, painful attempts as dialog between what I really regard as alien culture groups. They have been trying to communicate with each other in what I regard as painful and unsatisfying ways. Somehow we must improve this. I guess all of you are aware of these confrontations between the proponents and opponents of nuclear power, and maybe even taken part in them. The public press usually stereotypes this struggle as being the technical, industrial establishment versus "the little people."

It is regrettable that that kind of adversary situation has developed. One of the many reasons for this adversary situation is, in fact, not necessarily a cultural barrier in itself. From early times, hearings dealing with nuclear energy have had a kind of quasi-judicial character. That is to say, there have been hearings and decision boards and appelate boards, usually federally sponsored. These had a rather courtroom context. In fact, these hearings were usually conducted in a courtroom decorum--and the courtroom is an adversary forum. So, I think much of this atmosphere arose in that way, but that is not all of it. There has also been the development of opposition with more complex roots. I think clearly some of these are cultural blocks, resulting in a lack of mutual trust and confidence.

I wanted to tell you about some other events and institutional activities now taking shape which are also part of the same trend. One might hope these events would provide more productive and influential kinds of cultural intercourse between science and other sectors of society from these encounters I talked about in nuclear power. One of these is exemplified by the decisions of the U.S. Energy Research and Development Administration (ERDA) and also by the National Science Foundation and the National Institutes of Health, to hold public hearings throughout the nation to get input and advice on choosing scientific goals and programs and on selecting research proposals to implement these programs. Now, in my judgement, that genuinely is a new approach. Painful, perhaps, but a new approach bringing the public in.

ERDA, for example, commissioned the National Academy of Sciences and the National Academy of Engineering to generate a report on the nuclear program and the energy program in relationship to this nuclear option. They invited the academies to include public hearings as an aid in structuring its study of nuclear energy and its alternatives. The study, which involves a great deal of work besides these public hearings, is supposed to be that of nuclear power or alternative energy systems for the years 1980 to 2010, considering energy demand as well as energy supply. The study is not intended to promote particular options. Rather, it is supposed to set forth these options, try to establish as well as we can what the consequences of the options are, and then define the level of certainty we have in these options and in these consequences. The idea is that, in order to get a broad perspective on these comprehensive studies, the Academy of Sciences and the Academy of Engineering, working through the National Research Council, earlier this year held five one-day open hearings to receive the views of informed and concerned people regarding the approach and the plan of the study and the energy issues it will address. These hearings were held in New York, Atlanta, Minneapolis, Denver, and San Francisco. We are told that the first implementation of the new policy by both of these academies is of the following kind: Every time a study of high public interest is to be undertaken by the academy, each of those studies is to include, as an initial event, these open public hearings early in the planning stage so that citizens may have an opportunity to express their views, their comments and their concerns.

On February 5, I attended the public meeting in Denver, and I am going to tell you informally what I saw. First of all, it was very poorly attended and poorly publicized. The attendance was less than this crowd, perhaps no more than thirty people, half of whom were giving testimony. So, in a way, it was a disappointment as far as public involvement and I guess one could ask, cynically, "If the public is all this concerned about the nuclear energy option and the other options, where are they today?" They were not there. Many of the people who spoke to the subject of the poor attendance said that the publicity in the Denver papers had not been adequate. The comments that came about were relatively stereotyped and predictable and provocative, but they were useful. I might say cynically, you didn't need a program to tell the players. You knew who the environmentalists were, you knew who the representatives from the utilities were, you knew who the university community were, etcetera.

There were no real surprises.

It was a very provocative and, I found, encouraging discussion. The ideas, the questions and the thrust were properly aimed at trying to put some ideas into the study, not simply exposing one's personal position.

What shocked me a little bit was what I found as a very serious lack of complete information in the hands of people, even those who felt that they were informed and involved. I don't mean that critically of them, I really mean it critically of us in the scientific profession, that our information media had left so many questions unanswered in their minds when those answers were available and had been for some while.

The National Science Foundation is trying to do something like this also. Perhaps you know about this. The Science Foundation has now been required by Congressional mandate to develop what is called a "Science for Citizens" program. Senator Ted Kennedy is particularly associated with this. It has three purposes. First of all to improve public understanding of public policy issues. Secondly, to encourage scientists, engineers and students to be active in resolving public policy issues. And thirdly, to enable non-profit, public interest groups to acquire technical expertise needed for them to deal with the technological aspects of public policy issues.

There were seven public hearings across the country in December of 1975, gathering public opinion on how this "Science for Citizens" program should be structured. Obviously, it is part of a general Congressional push on the National Science Foundation to open up this decision-making machinery to a wider public participation. Senators Kennedy and Proxmire and others in Congress are continuing to press for the citizen's right to voice his opinion.

It probably doesn't surprise any of us that the Science Foundation is a little skeptical of all this and its members are saying, in a candid way, that they don't know how to deal with this new constituency. Their constituency has always been the scientific community. It has become, if not stereotyped, at least structured and organized. Now they are going to deal with a potentially contrary and disaggregated group of people--the public. I think it is inevitable that the public will have more to say about science as it is done and as it is sponsored by the various federal agencies.

The National Institutes of Health has done something comparable to this. This is not a field that I am as closely connected with so I am going to mention it just very briefly. There have been some public hearings of the NIH Peer Review System for selecting funded research from submitted proposals. Public hearings were also used to undertake a major review of NIH's methods for awarding research funds. These hearings have unleashed public comments, recommendations, and criticisms of the effectiveness of the present federal support system in serving and responding to societal needs, as well as maintaining scientific quality.

Quite obviously, these actions have not come from within science. I think it is proper to say these actions have been stimulated by public and political pressures. But I also think we should consider they are some manifestation of the desire on the part of the scientific community and the sponsors of science to develop a better rapport with other societal elements. The role and style of science in the future will undoubtedly be influenced.

It is likely that in time, new elements of scientific effort will develop as kind of a bridging function to other parts of our society. In fact, these National Science Foundation hearings have brought out several recommendations that I am sure will be considered further. One recommendation has been the creation of a Journal of Public Interest Science. Another recommendation has been the formation of regional science centers to identify science-related issues and provide information on them. I think the thrust here was not a bunch of "Gee whiz"-type museums, but genuine information centers where a member of the public, with a little homework on his part, can come in and get straight answers to scientific problems as he foresees them, or get straight answers to technical, social, economic problems as they are viewed through the eyes of the scientific profession. Another idea has been the formation of what could be called a national register of scientists, emulating the legal community, where a group of scientists would be willing to voluntarily serve as consultants to public bodies in scientific issues and technical issues having scientific content.

The idea of this new journal, The Journal of Public Interest Science, is compelling but difficult to describe. I don't know how to describe such a journal. I guess, instead, I would say two things it is not. I think it is not Scientific American. To me, Scientific American is a splendid journal for more or less simplified statements of scientific problems and and scientific findings. But I would see The Journal of Public Interest Science as it is recommended and considered by the Science Foundation to be one having some different purposes. First, its purpose is to generate public understanding of scientific facts and laws. Secondly, to present some content of digested scientific knowledge for practical purposes. (I guess I could say, parenthetically, that the physical sciences could learn a great deal from the agriculture community in this context.) And, thirdly, that journal, I think, should be some kind of an evaluation of scietific consequences, that is, consequences on human life and on social institutions.

Another thing I would say it is not is the journal you may be familiar with called The Ecologist. Now, The Ecologist is the other extreme and if my prejudices hang out, so be it. This journal is essentially anti-science. Provocative, useful, but genuinely anti-science. It is a journal in its second year of publication by Edward Goldsmith. It has proposed, somewhat tongue-in-cheek, the following: First, that the present industrial complex of the civilized world should be, on a program basis, dismantled; secondly, that scientific agriculture should be abandoned; and thirdly, that we ought to return to some kind of Arcadian culture, that is to say, the "path to perfect bliss" concept. It is fun to read and I think it is important to read, but I don't think that is the kind of journal that would communicate to the public on scientific issues, either.

Whether the science as we now know it will be diluted or enriched by these new elements I just mentioned is sure to be debated. Many scientists, my friends and my respected colleagues, are not in any sense unwilling or afraid to talk to the public. They just don't know how. Moreover, I think perhaps they feel some selfishness that it is too hard to learn and it really is not going to be helpful to their scientific careers. So there may be some element of dilution but I think it may be an important one.

Let me turn very briefly to this second trend that I mentioned to you I thought science was going to have to learn. That is, to treat complex, multivariable problems as kind of a complement to this traditional scientific approach. In a way, this trend is related to this first one. Science's inability, or unwillingness, to deal with complexity has inhibited its intercourse with other parts of our culture. I guess researchers in the agricultural sciences may find this trend statement naive. As I understand it, agricultural scientists have dealt with problems with many variables not under uniform control and have found statistical methods and models to cope with such experimental situations.

I think in contrast, the physical scientist that I must identify with, who has been doing bench-top research and sometimes large-machine research, luxuriated in his ability to control a much smaller number of variables with much more certainty. Now, in a sense, that is what the physcial scientist has had for his life-style. He is now in my laboratory dealing with energy problems which are very difficult to treat in that term. So I guess what we really have here is a trend away from probably one of the most sacred and time-honored perceptions of science--the "scientific method."

Now where did the scientific method originate? I don't know except that you can go back a long time and find the seeds of that statement. For example, I am going to quote you Roger Bacon in the 17th century. "Whereas in the past the proceeding has been to fly at once from the particulars to the most general proposition, my plan is to proceed regularly and gradually from one axiom to the next, so that the most general are not reached until the last--for when you come to them, they lie at the heart of things." In other words, treat it in simple little pieces, one at a time. That is the way the physical scientists have done. What I have just read, too, is a distilled essence of the deductive impericism. It dictates the selection of simple problem statements, simple models, simple experiments, with small number of variables, and I maintain that much of science today is not done in that traditional form.

The physical scientists in my field cannot simplify the problem, they can not simply adopt to a small number of variables that can be weighed and measured and counted. In fact, the number of variables is very large and not all of them are known with the same certainty.

The other thing that the traditional approach has always done is to neutralize the observer. The observer in the old traditional approach never showed up. He was always out of the picture. He was only paying attention to the outer world. Much of science these days, and I am including the physical sciences as well as the life sciences, must put the observer back in the process.

Let me tell you the situation as we see it in a large energy-related laboratory. Our people are now involved in research dealing with energy in its technological, economic, environmental and social options and trade-offs. They are experiencing some difficulty from the compartmentalization that has arisen from that old approach of the scientific method. What the physical sciences have called the "real world" has not been the total of common experience at all, but just those aspects that lent themselves to factual observation and general statements. My view is that it has had, at least in part, a stultifying effect on science. We find in energy research and development that everything is related to everything else. A complex model describing the total interplay of energy, materials and human needs is the only one that is valid, and it is the only one that is sufficiently comprehensive for energy-related science. Sub-systems of this model will be the essential matrices that we use in formulating our scientific expression.

Fortunately, science can tap technology for some help here, demonstrating once again that information flows in both ways, from the basic research to the application of that research and back. Basic science and applied science communicate well and information does not just flow from fundamental to applied. It comes back the other way. I am talking primarily about the discipline of systems analysis.

As you probably know, this began essentially in the term "operations analysis--operations research" about the time of WWII and it has now become a rather exact discipline. With the essential partner, the high speed digital computer, it permits the scientist to deal, with confidence if not enthusiasm, with problems and models of high complexity. Only an adverse attitude on the part of the scientist himself can slow this trend.

What is the approach of the systems analyst? I am going to read to you the script from the systems analysis approach. It is by no means complete, but it goes something as follows: "... A systems analyst accepts a complex problem. He doesn't remove variables, except those he thinks are second or third-order of importance." In the vernacular, if that particular part of the model is so insensitive that you can go out and ask the janitor for the number, and take it, then you may as well know it. Don't ignore it as a variable, simply because it is too complicated. You try carefully, systematically, with some trial and error, to find the variables that are the essential ones and then ignore the unessential variables. You take that and generate what amounts to a best-guess model, almost always nowadays a computer model. You break that computer model down into pieces that you can get some kind of analytical hold on and fully test in some experimental way. You go back to the lab or the field and make tests on these components of the model and try to sharpen them. You try to put it all back together as a model, run it through the computer, and you make some predictions. It tells you then where some very critical bench-mark experiments should be made. These would be large, costly experiments. But you don't make those experiments at random. You let the computer model tell you what is the best one. You make that experiment that validates or invalidates the model. You then go back and alter that model and start all over. So it is interrelationships of the model and a series of experiments that constitutes, what I believe, an important adjunct to the old scientific method. After a while, that approach becomes one where the computer model and the experimentation are almost indivisible. In fact, it is an interlocking system and a very powerful one that the systems analyst is now bequeathing back to the basic scientist, and he is going to have to use it. It should be said parenthetically that we do not know how to deal with one kind of variable, and I don't know when we will. Those are the rather more subjective ones that deal with opinions and personal values, and values of parts of society.

None of the models that we use, for example, to develop an integrated solar energy system really know how to treat those. We can treat some of the economics, but we can't treat these human values.

Let me ask a question in conclusion. Do I think that these two trends that I just enumerated for you, if they are valid and if they are enduring, are going to generate evolutionary or revolutionary changes in science? I don't think there is any clear answer. One thing I can say is this:

Revolution usually arises from internal crises rather than from external forces. I do not see the scientific community entirely complacent, but neither do I see it right now crisis-oriented. Therefore, simplistically, we might expect that there might be evolution in the scientific community, but not revolution. Such an evolution, if it does occur, would occur at some kind of a measured pace where the scientific community and science as a body would retain the validated and traditional scientific foundations that it has spent centuries putting together, while at the same time developing more productive interactions with other elements of our culture and hopefully being more venturesome in its treatment of the real world's problems.

--Edited by Richard M. Foster

INTERACTION II: Glenn Burton and Michael Nevitt

Listening Panelist: Dr. Burton, I would like for you to share with us some of your observations in terms of what you consider to be some of the most effective means of limiting population in the underdeveloped countries.

Burton: Well, this is rather interesting to know, and I doubt if very many of you do know, that India was the first country to introduce a nation-wide birth-control program. They put incentives into it which included, among other things, actually paying people to be sterile. It never really caught on very much for several reasons. One of these is that it is still economically sound to have more children. As long as there is an economic advantage in having children for poor people, they are probably going to continue to have them, unless you can have the kind of control that they have in China.

China today is doing a remarkable job of controlling its population, for about two or three reasons. One is that Chairman Mao has said that you can have two children, but you had better not have more than three. Another is the benefit doctor, the health nurse, that is assigned to a particular production team. She works with that production team. She is the one who administers the birth control information and teaches about using the pill a great deal. She is also a midwife. She knows all about what is going on for every one of the women who can bear children. Of course this is relayed on up and down the line. Tradition has much to do with this.

Another illustration--just a brief one. We have friends in India who were in Georgia when we were. We visited them in 1963. They had one of their servants--a man-servant--who had a wife who was not well. He had three children. He was a relatively young man. She convinced him he should be sterilized. He was. His wife died. He would like to marry again but he can't because a young woman will not marry him unless he can give her children. This is one of the hard parts.

You have the tradition in much of the world, for example, that there must be a male child. We were told in China that the pill did not work there in the rural areas where they still believe they must have a male child--until they have that male child. Then it works. There are a number of factors--those are just some of them.

Listening Panelist: Along that line, I had the opportunity to work with some people in Liberia and Nigeria last year, but especially in Liberia. I worked with some of these people who could understand what we were talking about, and so I asked them, "Why have eight children?" One lady came back, and said, "If you knew that four to five or six of your children would die before age five, you would have eight children also." Do you have any reaction to the life-hope philosophy?

Burton: What do you mean by the life-hope philosophy?

Listening Panelist: Well, that the United States should forget trying to feed the developing countries or actually do much to the system because the more you feed them the more they are going to breed and the more people there are, the more they are going to get.

Burton: As I indicated earlier, the United States could not feed the rest of the world if they wanted to, and it is my conviction that we ought not to try to. It is rather interesting, I think, that most of our exporting at normal times is going to nations like the USSR that are using that export primarily to provide the animal foods that go along with an increased affluence. I do think that we need to be in a position whenever we can to try to avert famine in the world, for humanitarian and other reasons. Many of the developing countries have indicated, as I understand it, that they really do not want to continue a "give, give, give" program. Again, for the very reason that their leaders realize this can hurt the country more than it can help it. Part of the reason is that you increase the numbers of people who are not able to take care of themselves.

Listening Panelist: Dr. Nevitt, you made a pretty good point about the problem of scientists communicating with other segments of society and the confrontations you are running into. It seems to me there is a very close parallel with agriculture because agriculture has got the problem of the use of pesticides and so forth. What do you see in the educational training program for future scientists so they can deal with this communication problem?

Nevitt: I think some of these things are in place already, but late, and maybe yet not adequate. I have observed recently that in dealing with graduate students, that all of them (not because they were told to, but because they felt it was essential) have begun to develop as part of their minor program a much stronger base in the humanities, especially in various cultural courses. In inquiring why, I think they articulated in many different ways some of these thoughts--that they had already seen what a tight and somewhat noncommunicative community they were about to join and they thought it essential that they begin to speak outward, as opposed to inward. That is part of it, really, to make them more articulate. I think the scientific community itself has been quite inarticulate, and as I said, other cultural segments just do not find them interesting to talk to.

Burton: I would like to add to that something you said, merely by emphasis. That is that we are going to have to learn to speak the language of the common man. This applies to our education wherever it may be.

Listening Panelist: Dr. Burton, you have the statement here, "We help people most when we help them help themselves." Now, are the people's traditions going to stand in the way of teaching them to help themselves? If so, about how long will it take to overcome the traditions? I am talking about methods of fertilization in some of the backward countries, countries that are using human wastes. How long is it going to be to get them to change their opinion to "yes, we can use commerical fertilizer"?

Burton: We can provide the information and we can provide the incentive. I think we will be amazed at how quickly the peasant farmer will adopt new practices. When I was in India in 1963, the millet breeders were telling me that the millet farmers would never grow the hybrid millets, because, among other things, they were going to have to pay a dollar a pound for the seed and that was just clear out of reason. But when the government provided an incentive price, and provided the fertilizer, and the other things that were necessary and the farmer could increase his yield several fold, there was no question. They simply could not supply enough seed. It caught on very fast. And I think this has been true in many places. First of all, I must say that we cannot take our expertise and apply it directly around the world. We have learned this wherever we go, I hope. But we can modify, I think, and I have had the feeling that it would be a waste of my time to go to any one country and work for a great length of time as a consultant. I think my input, if it is any good (and I think a great number of people feel the same way) will be to go and look at the problem and suggest, and then to get their own people to get busy and try to solve their problems.

Listening Panelist: I think I could agree with you for you, but isn't there a great need, and this is one of the implications that I have drawn from your remarks, that we need to be training more people in agricultural circles to work with people in the developing countries at their level--not to impose our practice on them? Or is it the other way around? Do we just need to send a specialist here and there?

Burton: Well, there is a tremendous need for agricultural education within these countries. There is no question that the good American teacher can go to Timbuctoo and he can get a job down there. But the tremendous danger is that he would do the job so completely, ignoring the native teacher who should be learning how to do it, that when he leaves, it will fall flat. He has either got to commit himself to spending the rest of his life down there or...

Listening Panelist: Why can't this be incorporated into their educational systems for those people doing that work? Why can't we train people that that is the way they are supposed to function?

Burton: I hope they can, but I think it is going to take a little different kind of training than many people have. One of my very best friends is Roy Blazer, who is an excellent research worker. Some of you know him, I am sure. He spent a couple of years down in Chile, and he did a tremendous job getting those people organized to do some forage research. Well, Roy is a tremendous organizer and a tremendous pusher and he had this going. But Roy did not want to spend the rest of his life there, so he came back. My understanding was that it pretty well fell flat. He did not have people there to go ahead and keep that thing moving. They depended on him, and when he was not there the job did not get done. This is what we have to be very careful of.

Nevitt: We have found almost the same thing in the Nuclear Energy Commission.

Listening Panelist: Dr. Nevitt, regarding the general public as it concerns both your business and ours, do you think the general public is damned about being informed?

Nevitt: I must tell you when I sat at that meeting in Denver and looked out and saw thirty people and decided that half of them were people there to give testimony, I had some questions in my mind. Yes, I think they do. I do not think it is valid to say this is a political issue being generated within the Congress without real public impetus. I do not believe that.

I think that it is harder for the public to articulate it and I think "public" is a bad and almost misleading term. It is a very disaggregated group of opinions we deal with. I think they do want to be informed. They may not even be able to express it that way, but I am convinced they do want to be informed, and the absence of that information (for a long time almost a deprivation of information on their part) has made them adversaries.

Listening Panelist: Well, update them again. Some of these complex processes could be explained simply enough so that even I could understand them!

Nevitt: Yes. We have got to teach the public to read in the first place. If they have not learned it by the time they get to your ag classes, you will do well to take time to teach them how to read. Those of us who write books need to decide what they can read and understand and describe our work in that same kind of language.

Listening Panelist: You say the public must also have a better understanding of the basic sciences, though, as we go into reading. I think so, but most of these scientific things do not have to be described in these great long words. I think you have said that very well, Dr. Nevitt.

Nevitt: They can be very simply described, if we will just work at it.

Listening Panelist: Mr. Burton, do you feel that maybe some of the problem is that underdeveloped countries just do not have the proper priorities? I have heard a place like India will spend millions of dollars on the atom bomb, which you know they need like a hole in the head. I was talking to Merlin Grote, president of the Iowa Soybean Association, this fall. He said if they would spend this money on food or for the development of education to produce more food, that they could provide the economic incentives that they really need. He feels the world as it now is could provide all the food we need if we have the economic incentives.

Burton: This is no doubt true today. I would agree one hundred percent. On the other hand, I would simply emphasize that India is merely doing what the United States and the rest of the countries are doing--spending most of our resources on machines to try to kill people; spending our money on past and future worlds. If we do not do something about the food issue, if we do not supply these inputs, we will be spending more of our resources trying to quell red (Communist) revolution. I do not think I can emphasize this too much. I do not think people are going to die of famine, just peacefully, any longer.

Listening Panelist: Dr. Burton, we refine our grains to a high extent in this country. We take wheat and we grind it down and so on. Does this create a need to increase production of grains? Do we lose a lot? Do we have to use a lot more acres to raise the grain to make the bread, so to speak?

Burton: Well, refining in the United States does not result in direct loss because the milling by-products go to feed livestock. There is a big loss, however, if you want to look at it as George Borgstrom does in Michigan State, for example. I wonder if any of you have heard George Borgstrom's story. If you haven't, you ought to listen to it, just because it is a fascinating approach. He says we should all look at feeding the world on a basis of protein, rather than on the basis of calories. If we do this, he says, we are currently producing enough protein to feed 19 billion people. Enough protein to feed 15 billion people goes through the animals. Now I never had a chance after I heard him make this speech to get him in a corner and ask him, what was he going to propose: that we just eliminate all these steaks that I enjoy eating, and these eggs that I want for breakfast? I hope he is not projecting that. But, in effect, what he has said is that we could feed 19 billion people in the world right now if the production of the protein that we make, that we can grow with our crops, if we were to eliminate all animals and have everybody eating the same kind of diets.

From the Chinese, we saw a diet of rice with enough soybean proteins to balance that and maybe a few vegetables they could grow on the side. The thing that sort of shakes you up with that is the pets in the United States consume enough protein to feed one hundred million people. Now, when you refine this wheat, or whatever the cereal may be, we are doing that to get something that we like to eat better than the rough product, so to speak. It is, again, a part of our affluence. This is happening around the world. When India becomes able financially, it is going to demand a better diet. This is one of the reasons we are having trouble trying to catch up with population increase so far as food production is concerned. More and more people all the time are demanding some of these meat products which we enjoy. I hope I do not live to see the day when we cannot have them. I hope further that my grandchildren can have some of them. I think we can do a lot in that direction, as was suggested I think by Keith Barrons, by improving our pastures and depending on our ruminants to help supply some of this food. There is an awful lot of land in this world that will not produce grain, but will produce some feed for livestock. The only way that man can get anything out of it is to run his goats over the desert to get something that the goat can eat and concentrate it so he, in turn, can live with it. But when we start feeding grain to livestock, particularly to the ruminant, I think we are, in a sense, trying to do something to eliminate a surplus that we have had in the past in the United States. We may not have too much in the future, if the world market develops as we think it will.

Listening Panelist: Both of you have indicated that there is a need for basic research. This is costly and it is time-consuming, but I suppose you would call it an investment in the future. Do you have trouble justifying this serendipity approach--finding things by chance and no real promise of productive results for twenty years?

Nevitt: Basic research, even in the prosperous post-Sputnik days, has always been funding-limited, and maybe it should be in fact. We have trouble getting enough funds for basic research. Frankly, in a National Laboratory where we try to put together basic and applied programs, we still depend on serendipity. But in a sense, we are trying to generate a climate in the laboratory where dialog between basic and applied people--each with his own responsibilities but in close communication--learn early in the game where the problems are. In fact, serendipity still is appropriate for us, but I guess we are not a totally serendipitous environment. We try to separate this serendipity very strongly by having these applied and basic missions cover a whole lot of scientific areas.

Burton: I would like to add to this statement that practically all of my research career has been involved in a combination of basic and applied research. I think this is the best kind of research--one kind supplementing the other. The last example I gave you, the slick-leafed pearl millet, is serendipitous. It occurred as a mutant. The young man who spotted it in the field saw it simply as a curiousity. I did not stop with that. I could see it as a potential means of increasing the intake of this animal which might like it better. If I could get more food into the animal, it might gain faster. And it was not until we conducted an actual test in a controlled grazing study that we discovered the animals did not do as well on it as we had expected them to. We finally dug into the thing and found out it was because the cuticle was more intact and the bacteria in the rumen that should get through the cuticle to digest the forage simply could not get through it as well, and the feedstuff stayed longer in the rumen. Then it occurred to me about a year ago that I should make this thing better able to stand drought. So we ran this simple little test with the test tubes, and it is the obvious thing in India and one or two other places where it is being checked out for drought resistance. The single gene is very easily controlled genetically. Now if this will increase the efficiency of water use, as I believe it will, and we have to test it because we never know until we have actually tested this out, this could be a tremendous thing in terms of increasing the food in the arid section of the world. I want to repeat again...now a major part of the food problem in the world is in this arid section, in what we think of as the tropics and semi-tropics.

Listening Panelist: Dr. Nevitt, you did not talk about it, but just what is some of the work being done in the area of solar energy and what implications will this have on agriculture in the future? Are we going to have power for our machinery? In other words, energy instead of fossil fuels? Or are we going to have some means of propelling our machinery or what?

Nevitt: Let me say, I do not know in any kind of quantitative way what part of our energy nowadays goes into the agricultural sector. It is a pretty high one. It seems to me that solar energy, in many ways, offers a rather unique set of conditions and possible solutions to some agricultural problems. First of all, we are involved in the laboratory in some rather unique types of solar collectors, which will lend themselves particularly well to a disaggregated approach where a solar collecting system can be placed on farms or in localized areas as opposed to large central generating stations, and they are both solar-electric and solar-thermal. Solar-electric meaning direct converion, and solar-thermal it seems to me, properly applied, could go into much of the agricultural processing and circumvent the use of what is now a fairly inefficient system of either using petroleum or using electricity. The other thing, and I guess Professor Havighurst will deal with this, is to turn this around--the use of living systems themselves as solar collectors directly by biomass approach, or being rather selective about cultivating the types of photosynthetic materials in growing plants and making rather more specialized use of those photosynthetics. I think solar energy is a rather unique approach. It is rather capital-intensive, so I do not agree with anyone thinking that solar is an obvious near-term solution. It is a very important part of the total energy system we will have by the end of the century, but because it is capital-intensive, because of the fact that in this part of the world one almost always has to have other redundant energy systems--conversely, some rather expensive storage systems--it is not going to supplant other forms of energy rapidly. But to repeat, I think the agricultural segment is one where solar energy will have an early impact.

Burton: Let me just add one interesting observation that I have had on this--of very minutely using solar energy, in a sense, and yet in a very significant way. When we were in China, I saw a solar-cooker--a simple reflector that would reflect sunlight onto the base of a pan. We were told that they could put three pounds of rice in this and put it out in the sun and they could cook it in forty minutes. Well, I came back convinced that this was something they needed in Pakistan and India and have developed a simple little model of this that can be made for just a few cents if you can find an empty gallon mayonnaise jar which they cannot find in India. But, you know, forty percent of the people in India cook their meals with cow dung. They ought to be using it for fertilizer. They do not have any other fuel. They have all kinds of sunshine and if they could use the solar cooker to cook their meal and use that cow dung to fertilize their crops, they would produce a lot more with it.

One of the members of our team, Professor Kuhn, from the University of Chicago, who has always lived in the city, looked at this solar cookery and said, "Aw, that's just a gimmick." And they said they had made a good many thousand of these in China. I said, "Now, wait a minute. If you had to climb that mountain that we passed this morning and rake up pine needles as those kids were doing, and then carry it back home to cook your rice, this would be a great invention." Well, he hadn't thought of it that way.

He guessed it would be.

We are doing some research at the University of Georgia trying to find out what kind of biomass we would have to produce in order to supply electricity for a city the size of Athens, which is thirty thousand people. It has been estimated that we could step up the production of some of our hybrid trees a little better than we are now able to do. We would have to have fifty square miles occupied by these trees to produce enough electrical energy to supply the needs of a city of thirty thousand. It will be awfully expensive electricity if we have to do it that way. I would like to ask you (Nevitt) a question--I have spent a lot of time looking at this energy thing and it seems to me that we must learn to capture the energy from fusion and then get permission to use it. It seems to me that the dangers associated with this are going to be tremendous. Unless we can do this, I cannot see down the road several hundred years where there is much hope for us.

Nevitt: I do not see any other properly called limitless energy source except fusion. We are arriving on the use of fusion energy today. We are in a rather strange position. We have spent twenty years in the laboratory with fusion, essentially with the single thought of containing this material called hot plasma, generating the right temperatures, and uncovering--time after time--unexpected negative serendipity, finding unexpected problems that were associated with getting the right confinement and the right temperature. About seven years ago, the Soviets with a relatively simple system broke the whole world out of a bad syndrome in terms of the stabilities of these plasmas. As a result, we have been in almost a euphoria for the past three or four years of expecting that we will demonstrate technical feasibility of this containment within five years. Now, that is just the laboratory demonstration of essentially a proper energy balance--namely that you are not putting in a whole lot more energy than you are getting out. Beyond that then is a very major engineering undertaking, of mind-boggling proportions, to make this into a central generating station. But at least the optimism in regard to this feasibility is at a point where the Energy Research and Development Administration is beginning to put substantial sums of money into the technology. That is to say, to start planning how to transfer that concept into an operating system. I do not see that becoming in our lifetime, and I almost question in our children's lifetime, an important source of energy. I think we are committed and stuck for at least one hundred and fifty or two hundred years to a combination of fossil and fission energy.

Burton: I think the world needs to realize just how fortunate we are to be able to enjoy what we can because of fossil fuels and fossil energy. We do not appreciate this at all--we are wasting it and throwing it away. And I wonder sometimes if two hundred years from now, if people will not look back on this as an age of great affluence because of energy. If you convert kilowatt hours to servants and take the number of kilowatt hours that the average home has in it, you see that you have thirty-two servants. I reminded my wife of this the other day and she said, "I'd like to swap a good many of them for one with a pair of hands!"

Listening Panelist: This is giving some strength then, to what they would call "alien culture groups" to nuclear energy and the present demands for energy. What is the future then of our present nuclear energy? For example, right here in this state we are considering one right near Des Moines. All this clamor! Do we have to learn to live with less energy or are we going to be able to depend on nuclear energy?

Nevitt: We are definitely going to have to learn to live with less energy. That is going to happen rather soon, because the number of nuclear plants for which construction permits have been granted and the ones that have been licensed to operate is down by something like fifty percent from what we would have anticipated and projected five years ago. Now the utilities told us (and I think with good statistics--they found in 1970), to be able to be using advantageously all the generating capacity that I have just said is not going to be in place. There is no question that we are going to be living with a lesser amount of electrical energy. At least less than we once projected.

Listening Panelist: As a public, why can't we develop a confidence? The vice-president alluded yesterday to the fact that in eighteen years there has not been a serious accident.

Burton: Again the restrictions are almost entirely public pressure. It is public pressure and lack of public understanding.

Nevitt: You do not generate it rapidly. I will have to say that for a number of years the Atomic Energy Commission took kind of a paternalistic point of view. Atomic energy was born under a classified context. It merged from the classification as far as peaceful applications were concerned, about 1955. But nonetheless, from the beginning the AEC did not perceive the need to communicate with the public. And I think the public reaction was the same, but not because there have been any demonstrable problems associated with the safety of nuclear power plants.

Listening Panelist: What about the engineers who are resigning from their jobs?

Nevitt: I know one of them--I know him. And I have not talked to him but I am convinced I should. I want to know myself, because these are three very able people. The one I know is not a "kook." He is not a person whose judgement you can dismiss. I guess I will just have to beg the question. I do not know what was involved. He is talking about those three engineers from the General Electric Corporation at San Jose.

Listening Panelist: Dr. Burton, should we be incorporating in the curriculum in the school (high school level agricultural programs) teaching about rural food needs and agriculture facts? Should this be a part of our school system?

Burton: I would say "yes," by all means. Everybody needs to be aware of this problem.

Listening Panelist: Do you know in any of the schools that you are associated with whether it is being done?

Burton: I can't answer that. I am afraid that part of the time when it is done, it is done with the wrong kind of information.

Listening Panelist: I think it is difficult to have us, as teachers in a school system, discuss palm oil, when they have never seen a palm tree.

Burton: You don't have to do it that way.

Listening Panelist: It would help make it relevant.

Second Listening Panelist: We are talking about agricultural education in two different perspectives. I think we are talking about it from a social context versus a vocational context and I think that it is important that we delineate that we are going one way or the other way or both. I think it is something that has an implication with regard to our programatic concerns, our administrative support, and so on. Hitching on to what you said there, Dr. Burton, everybody should know about it. I think that is a part of our total educational picture and maybe not just a part of the agricultural education picture.

Burton: Well, that is the major part, but I would certainly hate to teach a course in agriculture when it is ag credit. Some of these students might become some of the people who really make a difference in the world. I would like to charge you with a challenge, and that would be that those of you who are voc ag teachers search for the Archie Griffins in your crowd. There might be some kids who did not even want to go to college. That is the way I was. And it was the superintendent who kept after me for a full year before I finally decided to go to college and I am now thankful that he did.

Nevitt: I just want to add that I do see in this new agency--the Energy Research and Development Administration--a full realization of this lack of public understanding and maybe an eleventh-hour late commitment to turn this around. It will be hard.

-- Edited by Richard M. Foster

AGRICULTURE AND YOUTH IN THE YEAR 2000: DEVELOPMENTAL NEEDS OF SECONDARY AND POST-SECONDARY YOUTH

Robert J. Havighurst

First, I want to simply remind you of the ordinary developmental tasks of adolescents and young adults that we speak of--that is, the tasks that young people must achieve in order to go on growing up to be satisfactory and competent people. I have shortened the orthodox list that is in my book, Developmental Tasks in Education, because I wanted to focus on certain ones. Since the title of my assignment is secondary and post-secondary youth, I have taken roughly a ten-year period, from fourteen to twenty-five years of age. I am going to be just about as much concerned with the post-secondary youth as with secondary-aged youth. I suspect that this project is going to get itself pretty heavily involved responding to the challenges that we have heard this morning, with the curriculum at the post-secondary levels as well as the secondary. The ordinary tasks of development that we have--the main ones I am going to talk about--I will go over very quickly.

I need to make an important point and I am glad to see I have an audience here. This morning there were only two women here and what I am going to complain a little about is that this project seems to be concentrated very heavily on males, and anybody who knows anything about the next twenty-five years knows there is going to be enormous change in respect to women in the occupational field. Mr. Anderson gave me a very good lead this morning. It is perfectly clear that he has a family farm with a million dollars in assets. It is the woman who is going to have to take care of the bookkeeping and so on. There is no reason she should not do a much better job than a man. She can deal with the banker, she can deal with the accounts and so on. There is no use of trying to get a man in that job, as he probably would not be very good at handling the finance of the family farm.

Well, first, relating to age-mates of the same sex. I will not spend much time on that at the adult age-level. It is clear that as young people grow up through adolescence they learn how to behave as an adult with other people their own age. If they are choosing a team captain, ten-year-olds will still choose their best friends as a captain, but eighteen-year-olds do not do that. They choose the best man or woman as the captain.

Relating to age-mates of the opposite sex. Clearly we are in the middle of a major revolution with respect to relations between the sexes, starting at this early age level. One is developing a philosophy of life, an idealology. It is quite clear that around seventeen or eighteen, young people are most interested in exploring values and working out a set of values that they can live with. Eric Erickson calls that an idealology--a consistent set of values.

Related to that is choosing and preparing for an occupation. Erickson (quite rightly, I think) combines the development of an idealology and the choosing and preparing for an occupation as the achievement of identity. The achievement of identity is his major psycho-social task of youth. It is really a combination of forming one's own philosophy of life and working it out through one's choice of an occupation that consists of achieving an identity in our kind of society.

Then I have the tasks of the post-secondary period. These tasks go beyond the age of twenty-five, of course. They include: getting married, having and rearing children, becoming a homemaker, and getting well-started in a career. What I have done is to put these in two columns. One is labeled "male" and one is labeled "female." I want to call your attention to the fact that these tasks are, and have been for the past ten years, in the process of being redefined by themselves.

Getting married. Until recently, the notion was that all girls were concerned only with getting married. They chose the right college to get the right man and so on. We know that the median age of marriage has been raised for girls about a half year in the last ten years, and it had gone up a half year in the preceding ten years. Girls are getting married later. In general, it is not so clear to young women now, especially young women who finish high school and go to college, that their first aim is to get married. Their first aim may be something else, and marriage may be adjusted to other plans.

Then, having and rearing children, of course, is more and more a matter of choice with the many means of contraception now available. It is essentially the female's problem, but the husband has to make a choice in this, too.

Becoming a homemaker? I have put a question mark there because more and more we are finding that men are taking part in homemaking activities to give the wife a chance for occupational development also. More and more, young men are regarding it as part of their job to diaper the child, do some babysitting, and a certain amount of housework. Of course, with all the machinery we have to do housework now, it is not so difficult anyway.

Getting well-started in a career. This used to be the job of the young man. He finished high school and went right to work, or he went to college and then went right to work, or he went into graduate work. The aim was to move right into a career. Now the contrast of male and female that was so characteristic of our male-dominated society has obviously lost most of its course, or contrast. This is not just a matter of the National Organization for Women. I find that in Chicago and elsewhere. As a matter of fact, my own wife joined some of these things.

Women have as much right as anyone to choose how their time, their life style, or their family is going to be organized and so on. It is perfectly clear, if you will just look at the data on women in the labor force, that you are going to find most women in the labor force are thirty-five years of age or older. The average woman has her last child at the age of twenty-five now and it is usually a smaller family. By the age of thirty-five she can easily leave, be away from home for hours a day on a job. The data makes it perfectly clear that women have moved into the labor force in enormously large numbers, which, incidentally, makes it a little more difficult for males to find jobs at a time when the labor force does not need everybody. Part of the unemployment rate of males at the present time is related to the fact that women have moved into the labor force since 1950 in enormous numbers.

So we have then the problem for a young couple, if they decide to get married, to decide to some extent when they are going to have children, and how many they are going to have. They say we are headed for a replacement birth level only in this country. We are below the replacement level at the present time. The fertility ratio is below 2.1 children per woman of child-bearing age. It was very high right after the war and that gave us the "baby boom." Then it dropped after 1961 and it is below replacement level now. The general presumption is that in two or three years it will probably be up to the replacement level. It will probably stay right there from here on, because the American social idealology and practice will be to maintain population at replacement level plus whatever immigration we permit. So much then for that.

Let me say here that before this project goes along very far, there is going to be an annex with respect to women in agricultural careers and women in rural communities and so on. What kind of education should they have in high school?

Well, now I want to move to the area of demography. First, let me say just a word about the next fifty years with respect to the proportion of young people aged fifteen to twenty-four in relation to the proportion aged twenty-six to sixty-four, who are the ones making up the main body of the labor force. In 1950 the proportion was .29. That was the right time to break into the labor force if you were a young person because of the low ratio. Let us say that it stayed at .29 until 1960. The baby boom started in 1954 and went to 1961, and for those seven straight years, we had more than four million births per year. Before that we had been having 3.1 to 3.5 million births per year, and we are back down to 3.1 million again now. So the ratio of younger people to older people in the labor market jumped up to .41, which means that anyone who came into this age period of fifteen to twenty-four years in 1970 was just at the wrong time to get into the labor force without a lot of competition.

In 1980, it will be almost the same. This decade is in the middle of the real crisis for unemployment of youth. Then it will drop back down, assuming (as I did) a fertility ratio of 2.1 for women, which is replacement only, plus 400,000 immigrants a year, which is what we have had for some time. We will drop down to a ratio of .32 for 1990 and 2000. It will be down to .28 in 2025 when we will have a stationary population. So the question is critical in terms of a sheer demographics problem in these ten years we are in right now until about 1985.

My own guess is that as soon as we get the current election out of the way, we will probably have a national service corps for young people who will be paid about $2000 a year for useful services. It will run until such time as the enormously high unemployment rate of young people is over, which will be maybe 1985. That unemployment rate, which is eight percent for the total group, is about twenty percent for young people aged sixteen to twenty years. Another twenty percent may be hidden because these young people do not even bother to register since they do not think they can get jobs. In a big city like Chicago, we have about forty percent unemployment of youth aged sixteen to twenty. It is a very serious problem. A lot of the crime we hear about is focused in that age group, and it is primarily because they have nothing else to do and do not have any resources to work with unless they mug somebody or kill somebody or something similar.

Now let me move quickly over to Table 1 which is the twelve-year-old population. I deliberately took the twelve-year-olds in 1960 and 1970 because they will be seventeen-year-olds this year (1976). I am interested here in the rural and the urban distribution. You will see that the twelve-year-old population in 1960 was 3.5 million and in 1970 was 4.2 million, because we were right in the middle of that baby boom period. So we had 4.2 million twelve-year-olds in 1970 and we have about that many seventeen-year-olds this year.

Looking at the division between urban and rural populations, sixty-six percent were urban in 1960 and seventy-one percent were urban in 1970. Then I distributed the rural population between the small towns of 1000 to 2500 and the towns of less than 1000 and farms. We see the great bulk of the young rural people are in the village and in the open country. If you will just look at the 1970 percentages, three percent of the youth (both sexes) were in the 1000 to 2500 population and twenty-six percent in towns of less than 1000 or on the farm, so it is a heavily rural group. Those who are rural are rural. They are not in towns of populations greater than 1000. Although the number has decreased in the last ten years (from thirty-four percent to twenty-nine percent) it still is a large population group. The boys and girls in this group are about equal in number.

Then you will see the occupations in Table 2. I have taken the occupational census for 1970. What I have here is, first, the total male population sixteen years of age and over in the labor force. (It was 47.6 million.) Then I have divided it into age groups of sixteen to seventeen years, eighteen to nineteen years, twenty to twenty-four years, and twenty-five to twenty-nine years, as well as the median age. Under that I have listed farm occupations. The two groups are farmers and managers on the one hand, and laborers and foremen on the other. Here we have the paid and unpaid laborers because farm workers are registered in the census very often as family workers, but unpaid. So, what we have here if we look at the ages sixteen to seventeen is 1,223,000 in the male labor force; 4500 are farmers or farm managers and 82,000 are laborers and foremen. Most of these were being paid. Moving up to the eighteen to nineteen-year-old age group, we have 8600 farmers and farm managers and 70,000 laborers and foremen. We find that the paid and unpaid family workers are there. Then we move up to the twenty to twenty-four-year-old age group, and here we begin to get a sizable number of farmers and farm managers. 46,000 are farmers and farm managers and 100,000 are laborers and foremen. When we move up to twenty-five and twenty-nine-year-olds, we find an even higher number (76,000) of the age group are farmers and farm managers and less than that are foremen and laborers.

In other words, the fellow who does get hold of the father's farm or who becomes an owner or manager, does so by the the age of twenty-five to twenty-nine. The portion of unpaid family workers in this group is very small. Notice the median ages of these groups. I will not spend time on them, but you can look at the percentages. I will remind us that farm occupations in 1970 made up 4.5% of the male labor force. For the twenty-five to twenty-nine-year-old age group it was 2.6%. Whether this is a projection of the future we do not know. One could wonder with that few of the males in the labor force working at farm occupations in 1970.

Now just a couple of minutes on this next one. I confess that I probably have made some errors here but somebody can correct it later on. I do not think it is worth our time here. I looked at the enrollment in federally-aided vocational classes in the Digest of Educational Statistics. They have changed the rules on us since 1950 or 1960 and I do not quite understand them, so I may not be accurate here. In any case, here is the total enrollment in grades seven to twelve in public schools. At the top of the table, enrollment in 1948 was almost seven million. In 1970 it was 17½ million--more than doubled. This is a reflection of the baby boom, of course. In 1973 and 1974 (the latest we have figures for), enrollment was 18.4 million. Now, in vocational agriculture (in secondary federally-aided vocational classes) we had 373,000 in 1948 and 1949. This went up to 508,000 in 1960 and then apparently dropped in 1970 to 370,000. But there is a problem with the meaning of that. There is a footnote that says something I do not quite understand so I would not guarantee that there has been a reduction in the enrollment in vocational agriculture. It does look as though there may have been. Does anybody know offhand whether there has been a reduction nationwide? All right, then, home economics (which is both urban and rural) was 800,000. This is vocational home economics, which is federally aided. It has gone up with the population increase. Looking at the percentages, the enrollment currently is 14.6% of the total enrollment at the present time, the highest it has ever been. This is including both urban and city schools. Remember that this is high school level, not university.

Vocational trade and industrial education, which would be more urbanized was 5.4% in 1948 and 1949. It seems to have been reduced, also. I don't quite understand it, but do not want to spend any more time on that. If you want to, spend some time on it in the discussion, all right?

Now I am going to move over into another topic. I am glad you had these questions for Dr. Nevitt, because he helped lay the groundwork for what I am going to talk about here. I will first state quite flatly that it seems to me that the nature of our society--the social, the civic, and the economic--is going to depend on our energy, the cost of energy and the availability of energy in the next twenty-five years. And even moreso, anybody who is concerned about a habitable planet for their grandchildren ought to be doing something about it right now to assure that energy will be available without unnecessary expense in the year 2050. This is a straight set of facts that I wish more Americans would begin to worry about. What has happened is that in the twentieth century, the Western world built its technology, its industry, its society, on cheap petroleum--black stuff that bubbled out of the earth. I will bet you could buy oil for a dollar a barrel for a long time. It was not until two years ago that oil really became less than cheap, when the price was doubled because of the OPEC countries. All of a sudden, people began to realize that for one man-hour, the money that the ordinary person could earn in an hour's work, he could drive five hundred miles in his car, up until 1973. Now he can drive about 250 miles per man-hour of work because of the increased cost of gasoline. The cost of energy per unit of gasoline has doubled. I suppose anyone could predict that it will double again in the next twenty-five years. It will at least double again. Then it will all be gone, except for a small, hard-to-get-at reserve. It will be much more expensive, and we will certainly be relying much less on oil.

Now if you will, look at this oil and coal reserve table. I am fascinated by this. This was created by a government commission on Population Growth in the American Future. It is volume three of their work. This is called "Population, Resources, and the Environment." It was published in 1972. (I think it was probably put to bed in 1971.) It is fascinating to see that they did not mention solar energy as a possible source for energy. These were the best people we had in the field of energy. If you will just look quickly at the top of the table, we have oil and coal reserves (based on the best available data on the reserves as of about 1968 or 1969) and they had computed the future years of production at the 1972 rate of consumption. Then they assumed a growth of more than five percent a year in our country for this century. This was a conservative assumption.

What we see here is a map divided into various areas of the world. If the energy was consumed where it was produced, you would have an interesting variation. North America (Canada and the U.S.A.) would have twelve years left at the 1972 rate; Western Europe, eighty years (they do not have very much, but they were not using very much, you see); Japan, only four years; and China, one hundred five years left. China had only 2.9% of the world's reserve, but it was not using much oil in that year. If you take the whole world consumption rate, then, it would last thirty-seven years at the 1972 rate. But if you have a growth in use of five percent a year then it will last only twenty-one years. Twenty-one years from 1972 puts us in 1999. At that time there will not be any more oil. Of course, there will be a small amount of petroleum reserve being discovered, but not as much from here on out.

The amount of coal reserves is much larger. At the 1972 consumption rate for the world, it would last 1725 years. However, they made a very conservative estimate of a growth of only two percent annually in the use of coal. They still thought at that time that it was oil that would be used primarily. To get some notion of what an exponential curve is, or means, just look at this. This is an exponential curve--increasing two percent each year. That 1725 years of use at the 1972 rate will be gone in 180 years if we just increase the consumption of coal at two percent a year. So the coal would be gone in the year 2150. Of course, it is true that the earth may cool off, but that will take eons. My own notion is that it would be a good thing if people like ourselves would be concerned for about the next two hundred years. Then we could say we were leaving it to our successors. I would like to feel that the seventh generation of my family would still be able to live on a habitable planet. After that, I sort of lose interest!

Now, let us look at the energy consumption of the U.S.A. and the world. Here we have the potential energy figures for 1968 consumption and the assumed consumption in 1980 and 2000. What we have here is coal providing twenty-one percent of the consumed energy in 1968 in this country; forty-three percent came from oil; thirty-one percent from natural gas (which is, of course, largely fossil fuel); thirty-eight percent came from hydroelectric power, and nuclear energy contributed 0.2%. Those are measured in British Thermal Units in quadriilions--62.4 quadrillion British Thermal Units--which was thirty-three percent of the world's consumption of energy. We had six percent of the world's population and thirty-three percent of the world's consumption that year. The rest of the world consumed the other sixty-seven percent. They consumed just about twice as much as the United States did--127.3 quadrillion British Thermal Units.

The rest of it is projection. Our proportion would go down to twenty-eight percent because the rest of the world is moving up in demand now. But see the change. Coal would go down some, oil would go down some, natural gas would go down some, and the only gain would be the production of nuclear energy. So what they are relying on would be nuclear energy to make up for the decrease in the others. By the year 2000, 13.8% of our energy would come from coal, 31.4% from oil (and I am sure they have revised that by this time), 24.8% from natural gas, 2.9% from hydroelectric power, and 27.1% from nuclear sources.

In effect, the experts on energy production and consumption who got together with the government in 1970 were saying that we have to move up to having twenty-seven percent of our energy consumption coming from nuclear sources. Now we just heard Dr. Nevitt tell us he doubted that. He said that fusion energy is not likely to be any more than hoped-for on the drawing boards and not commercially available for another twenty-five years, at least. So fusion energy can be put to work. What is happening here is the University of Chicago, or at least the Argonne National Laboratory, and the Russians are collaborating on creating an enormously high magnetic field which can compress these light elements--the protons and the neutrons--and create almost the same temperature as the sun. If you drive them together and treat them so they will collide and combine to form helium (which is a safe enough element), they will give out particles of mass in terms of energy. This is the great hope we have, because it depends on essentially heavy hydrogen and deuterium, which the oceans have a lot of. Presumably it would cost money to get it out of there. But, it is fission which the nuclear reactors are now using that people are concerned about.

Now I want to spend the rest of my time on this matter of solar energy. We need desperately to learn more about the financing and costs of available solar energy. Argonne now has twenty to twenty-five percent of its resources going into research on solar energy. They are also working to get the sulphur out of low-grade coal, so that we can use the coal from southern Illinois without poisoning the atmosphere too much, as well as financing solar energy research.

We have a fascinating parabolic mirror arrangement for collecting solar energy. Professor Winston, a physicist, started by collecting the light from distant stars with his parabolic collector. It turns out that a parabolic mirror will take the incoming radiation or light from any angle and focus it on the same place so that you can collect the light from the distant stars from all over the heavens with this kind of collector. Thus, they are able to study the nature of distant stars by collecting the light. Why not do it with the sun? Recently Winston got the idea, and the laboratory is now working to try to develop this parabolic collector so that you do not have to keep moving it around as the sun goes up and down. Apparently, you can just set it and it will collect the rays of the sun wherever the sun is in the sky, focus the heat, and you can use it to boil water and have a little steam-electric generator or use that heat any way you want to. One of the main problems that Argonne will be working on is how much will that cost per thermal unit be, to turn that energy from the sun into, for example, electrical energy? It would have to have some kind of intermediate, like a steam generator, and they will be working to find out how much that would cost. One of my colleagues told me that the best solar energy machines we have now that can be put on a house top (and heat the house and so on) actually will produce electrical energy at a cost of only twice what Consolidated Edison charges in Chicago. I wonder if he is right on that. Well, it does not take capital costs into consideration. Of course, capital costs are expensive with nuclear energy also and they are going to be moreso, I guess, to keep them safe. In any case, our real problem here is to try a variety of ways of collecting solar energy and find out what it costs to turn that energy into useful available electricity.

Now I am at kind of a turning point. Mesarovic is an engineer at Case in western Missouri. Pestel is an engineer at the University of Hanover in Germany. This is the second study they have run and this one is to be taken more seriously than the first. They have divided the world into ten areas and have computed the costs of covering the Sahara Desert (or the Mojave) with solar collectors. They contend that about half the energy needed in the world could be provided this way. They have not computed the cost exactly, but what we would do there (presumably) is use enough water to generate electricity, then either send it by wire or electrolyze water and get hydrogen right away, then ship the hydrogen around in tanks.

Food is the other concern...photosynthesis, actually. To some extent, I learned something on that from Dr. Burton's talk this morning. I was thinking of Pimental's study at Cornell's ag school. They carefully studied one acre of corn. They turned everything into energy units.. the cost of cultivating, the cost of fertilizing, the cost of drying, and the human labor, and so on. It produced about eighty-five bushels of corn to the acre and then they computed the energy in the corn. What they got was three units of energy in the crop for every one unit of energy they put in. Where did the other two units come from? Of course, from the sun. The corn had captured the solar energy. They did not compute a cost element except in terms of the energy you put in. Well, this begins to make us wonder whether we should simply turn corn into alcohol to run our automobiles instead of for our cocktails. How much would that cost? The other thing, of course, is to use the green corn or the whole variety of certain cane--broadleaf or green material--to perhaps grow two or three crops a year and ferment that for gas--that is, for methane. So there are two ways for using the sun--using the energy directly, or turning it into a fuel through the use of plants.

Our big problem is to find out what it will cost when we get the technology developed. Maybe we can breed a broadleaf green material that will produce more stalk--we are not interested in the grain in that case. And maybe we can breed corn that would have a higher carbohydrate content-- we do not care about the protein in that case. So our question here is (and this is very important for agriculture, you see) whether we may not have energy farms all over the Middle West where people are growing things to sell for energy rather than to sell for food. It is clearly an economic question. How much would it cost? The big problem here for rural youth is: will agriculture turn to energy production as well as food production?

I would suppose for the next twenty-five years our vocational ag instructors are going to have to learn these things. There is no reason that a high school youngster cannot learn a lot of this. Dr. Burton put that very clearly this morning. The universities in ag will be going more and more into the technology of things. Then there will be women becoming involved...no reason we can't have women as vocational educators. I understand you have one graduating here this year. How many women do you have as freshmen? Ten or twelve? The number of women in engineering schools has gone up enormously, of course, from a small base, but significantly in the past ten or fifteen years. This will affect the social studies because this is a civic problem. Vocational agriculture in the small communities will be training a good many students going into the production of energy as well as for producing food and being employed in the service jobs--that is, keeping the machinery going and doing the bookkeeping and so on. It would seem to me not an idle dream that the curriculum for the next twenty-five years is going to revolve largely around energy and the use of energy, the conservation of energy, the cost of energy, and the production of energy. This would be particularly in the areas where it can be produced. Whether photosynthesis is a major solution or whether it will have to be solar collectors on housetops or in the deserts that will be used instead just remains to be seen.

--Edited by Richard M. Foster

CHANGING PATTERNS IN VOCATIONAL AND CAREER DECISION MAKING

H. B. Gelatt

We've been told that the purpose of the project is to take a look at the purposes, goals and objectives of agricultural education in Iowa; to reassess them and to take a look at their future; to do some revision of these philosophical principles that would direct the goals and objectives of education in this state for the next number of years. My comments are going to be aimed at somewhat philosophical questions the listening panel may want to consider in relationship to career choice and career decision-making and the choices that they would have in providing some of this in their curriculum. I probably don't need to say so, but I have some biases obviously in this area and if they don't come out I'll try to indicate them as we go along. Dr. Crawford indicated last night that the theme in your department here is "This We Believe"--trying to take a look at and establish the belief you have about education, particularly agricultural education. I believe that's going to be the theme of my presentation--to take a look at what you believe and have this be the basis of your decisions about the kind of curriculum that you would develop. I'm going to vary somewhat from my outline. If you have some questions, you can refer me back to it.

I'm going to make four points, or cover four areas here, the first being to take a look at the dangers of the very thing we're doing--the dangers of predicting and forecasting--taking a look at the future. We've already been told humans have been doing this from the first of recorded history. I think it's worth looking at some of the dangers of doing this. Secondly, to look at the importance of doing that...the importance of looking ahead into the future in terms of our decisions today. And third, I'm going to suggest a couple of philosophical choices I see the panel has, in wrestling with what they believe before they make their decisions. Finally, I'll talk about some current factors and trends in career decision-making that you would consider. It seems very simple--my job is to talk to you, and your job is to listen to me. And I hope I finish my job before you do!

Let's begin by taking a look at the dangers. It's clear, I think, that the future isn't what it used to be. There's a metaphor that's interesting to suggest that mankind or womankind has been likened to the passengers on a bus passing through life. Where the seats of this bus are all turned backward, so that the passengers can only see where they've been--not where they're going. Sometime later, Marshall McKuen used a similar metaphor talking about the rear view mirror syndrome adults have--where we had a fixation of the rear view mirror and we're paying attention only to where we've come from, and not where we're going. This is suggesting, if the future is changing as rapidly as we're told, that the experience we have may very well be a handicap to us in looking and in projecting towards the future.

Margaret Mead used a nice analogy to the generation gap talked about some years ago and suggested this was like the gap that the early immigrants experienced when they first came to this country. When the children of the immigrants were born here, they knew about living in this country, whereas the adults had to learn about it.

There's a problem of overcoming looking at the future, that is, overcoming our handicap of seeing it as some kind of extension of the past. Even apparently our God Almighty had trouble with this. One of my favorite quotations is one that suggests that if God had known what schools were going to be like, he would have made children differently. So the trouble with taking a look ahead and making some decisions today about what we ought to be preparing people for in the future has this danger. It's highlighted best, I think, by the cartoon of the Stone-Age couple sitting outside of their cave one day. The man is laboriously rubbing two sticks together. Eventually a spark or two appears and smoke comes up. But his nagging wife, sitting next to him, says, "Why don't you invent something useful? Like a dinosaur trap?"

This is related to the serendipity we talked about before. There is the danger of even missing some of the serendipity because we fail to see it when we are handicapped by our past. I'm belaboring this issue of experience as a handicap because it's very relevant, I hope you'll see in a minute, to learning about how to make wise decisions. It's also a problem when you think about adults trying to make decisions about what youth ought to learn when adults in some way have this handicap and the youth do not.

Let's then look at the importance of looking at the future, recognizing that it may have some of these dangers. I like the notion of a scientist being a prisoner of science. Sometimes we have to think of ourselves as a prisoner of our experience. The future is a part of every single decision. You think about decision-making. I hope to show you that each decision you make, each action you take, is somehow a prediction of what you think about the future--an outcome to reach.

For example, if you think about the decisions that Alice in Wonderland was making as she went through her trip...the one time she came to a fork in the road and didn't know which way to go, so she asked the Cheshire cat, "Which way should I go from here?" The cat said, "Well, that depends on where you want to go." Alice said, "It doesn't really matter. I don't care much." So the cat said, "Well, then it doesn't make any difference which way you go." It seems to me that goal-setting, that is looking ahead and deciding where we want to go, is one of the greatest lessons we can teach. It's been suggested that learning how to set goals is one of the greatest needs of mankind.

Setting goals is nothing more than taking a look at the future and deciding what you want. The next step is deciding how to achieve these goals. It's like predicting and creating a future. So I see that the taking a look at the future is wrapped up in decision-making and one of the important roles education can play is teaching us how to set goals.

Let me just give an example from decision-making theory. I'm not intending to teach decision-making here but this will illustrate the point. It's said that there are four basic information requirements of a good decision. The four basic requirements are these: first, decision-makers should know all the possible alternatives there are from which to choose; second, he or she should know what are the possible outcomes of each of these possible alternatives; third, what are the probabilities of these outcomes or how likely are they to occur; and fourth, what are the desirabilities to me of each of these outcomes. If you'll notice, it's curious to me that three out of the four basic information requirements of a good decision has to do with the future. That is, it's looking ahead to the outcome of a choice I might take.

The problem in education is for educators to decide what we're going to teach to our youth. Will we teach a process of deciding or teach some specific decisions to be made, particularly in terms of career choice? I live right near Charles Schulz, the author of one of the most famous psychological or philosophical pieces of literature there is--"Peanuts," and I'm reminded of an interesting interlude between Charlie Brown and Linus one day after a particularly hard time in the second grade. Charlie, as you know, is often discouraged. This time he says, "Life is just too much for me. I've been confused since the day I was born. I think the trouble is we're thrown into life too fast. We're not really prepared." Linus looked at him and said, "What do you want, Charlie? A chance to warm up first?" I think in a way there's a point there. Perhaps we've been expecting people to learn how to make choices by living and by making those choices. In almost no other important area of skill development do we leave this to chance.

It's been only recently that the notion of giving people a chance to learn how to make decisions and practice in schools has been developed. As you might have guessed, this is a field I'm very interested in and I have devoted some of my recent professional life to the development of curriculum helping students learn how to make decisions. The problem you face right away is if you're going to teach students how to make decisions, which theory of career choice do you use? What I'm going to suggest, of course, is one based on a very rational approach to choice which has to do with selecting your objectives and choosing actions to meet them. This may not be very salable to the youth of the future.

Let me go to the third point, and talk about some philosophical choices that I see the panel facing in terms of what to teach in regard to career decision-making. First, let's look and see how people really choose their careers. There are a lot of theories, a lot of speculation, but what really happens? I'm going to use a self-report on a person named Hobart Foote--his own analysis of career development. This comes from Studs Terkel's book Working. He says, "I'm from Alabama, my wife and kids are Hoosiers. I was gonna work a few years and buy me a new car and head back south. Well, I met the wife now and that kinda changed my plans. I might've been working in some small factory down south or I might have gone to Detroit where I worked before or I might have gone to Kalamazoo where I worked before. Or else I mighta stuck on a farm somewheres, just grubbing off a farm somewhere. You never know what you woulda did. You can't plan too far in advance, 'cause there's always a stumblin' block." Now, you see there in Mr. Foote, no careful matching of abilities and interests with job characteristics, no attempt to implement the self-concept, and no sequential development through progressive developmental stages. His perception of career decision-making is far different from the purists who devised them. Faced with environmental circumstances beyond his control he starts out saving for one thing--a car--and ends up paying for something else--a wife and kids. Hobart Foote probably didn't take any courses in career decision-making, and probably never had a course in career education. The interesting question is: Would it have made any difference if he had?

I see two major questions facing the listening panel in terms of career decision-making. The first one is, can we teach the youth today to be independent, autonomous decision-makers? Can we teach them and, if you just think of career choice, give them skills to be autonomous career decision-makers? And the second question is, do we want to? If you want to narrow it down just to career choice or to Iowa, you might think about the boy born on the farm in Iowa, with his family here. We've heard about family farming and moving into a career this way. What kind of independence and what kind of skills would we give this person, in terms of giving him the broad, free range of career choice? How much career choice is fortudinous, accidental, or created by the circumstances beyond which we have little control? How much of it can we give to the individual who has control over his own destiny, so to speak.

Now, if you say "no" to either of those questions, then you have some difficult options also, I believe. Then you need to consider whether you should teach the students what to decide, that is, provide them some information to have them make the kinds of career choices you would like to see them make. And of course we can do this. We used to call it "socialization." Education has been known to transmit the culture to its youth. We want to indoctrinate the youth into the values, into the choices, that we think would be appropriate for society and for them. This would all be done in the good interest of society and the individuals, I'm sure.

Another choice is, should we influence career choice in this state or in this nation through more indirect methods rather than teaching? Perhaps this is a more powerful way to have students turn into the adults we think they should turn into, to have more broad social impact. I heard this morning terms like "incentives." When you want people of India to do something that's to their own benefit, you provide incentives to see that they do this. We do it in the United States. We have scholarships, we have stipends, even advertising promotions to help the youth see the right kinds of choices that they should be making, whether it's in agriculture careers or something else. If, for example, we are not the captains of our ships, or we are the victims of the conditions of society, it seems to me that we need to decide the kinds of values that we are going to teach the students or the influence we would make on society to see that students make those kinds of decisions.

On the other hand, if you say "yes" to both of the previous questions, that is, that you believe individuals should and can learn to increase the control they have over their own lives and make their decisions, and that you believe public education should play a part in that, then you would want to set about to design a curriculum that would teach the skills of independence of powerful autonomous decision-making. This, of course, is what I happen to believe in. I believe it's a similar suggestion, too, that Dr. Burton gave us earlier today when he said, "We help people most when we help them help themselves." Providing students with skills to make their own decisions is like helping them to help themselves rather than providing them with the information and the values to make the kind of choices we think they should make. I believe it's no longer a question of "Can we teach the youth of today to think for themselves?" The question again is "Do we want to?"

I don't have any proof that any kind of curriculum will, in fact, increase a persons's control or result in a more satisfying outcome. There is, of course, the rising debate in society over free will versus determinism. B. F. Skinner indicates in his book that we are the victims of the society. We revolt against that, and yet many people feel that we are not in the position of being autonomous. And then there is the growing notion that people not only in some ways want autonomy, but they fear it at the same time. Walter Kaufmann coined the phrase "decidophobia" to suggest that many of our youth and adults today suffer from the fear of making those decisions that are so fateful to us and would like to turn over the decision-making to someone else.

Let me suggest a few current trends that I see developing for you to consider when you're thinking about the possibility of career decision-making in your secondary and post-secondary school curriculum. Choosing a career today is different, I believe, than it has ever been and will probably become more difficult as time goes on. First of all, there is this notion of future shock that I've already alluded to and you've heard many times. In the past, there were the comfortable, easy reasons for making choices. It was through revelation, or the Scriptures. God told me to behave this way or to make this choice. This was tradition, everybody does it this way. It's the right thing to do. Or it was because of my experience. I will do this because my experience tells me. Many of those reasons are all but gone, and so there is increasing uncomfortableness and fear. Also with the future changing like it is, the outcomes of our decisions are much more uncertain. We'll learn in a few moments that uncertainty is one of the key problems in decision-making and uncertainty seems to be increasing.

There is a growing movement that I alluded to earlier, of youth and others away from rationality to the adoption of some of the Eastern philosophical points of view. The teachings of the Tao or of Zen suggest that intuition is more real than some of the rest of us might think, that you make your choices on the feeling of how you feel about this, or you let things happen because what happens seems to be right. So the rational approach of setting goals and objectives, looking for alternatives to achieve these and picking the best ones is not thought of very highly by these philosophical points of view.

The second problem that makes career decision-making more difficult today is the pluralistic values of society. There are many, many acceptable values. You'll see in a moment that one of the problems with decision-making is being very clear about these values. With so many from which to choose, it's more difficult to be clear about your values. It's also more likely that a decision will force some values into conflict. The single most difficult problem with decision-making is when one or more values conflict and you have to take a choice. In the university, you may decide, "I believe this and I believe this and I believe this." That's fine, but some decisions are going to require you to say, "which do you believe most?" Some of these beliefs or values are going to come into conflict with each other when a choice is made. This is when decision-making becomes difficult, and we're having more of these kinds of value conflicts to deal with.

We talk a lot in education about values clarification, but how about value construction? Are we willing to teach people procedures to construct some new values? It's certainly the opposite coin from indoctrination, if we think of the idea as helping people learn to take a look at many values, perhaps choosing some new values for themselves, as a truly autonomous person would. That's quite a different kind of education than that of passing the values of one generation to the next. Values in conflict is one of the most serious problems in decision-making. I was very interested in Dr. Nevitt's comment that we really don't know a great deal about how to deal with the subjective variables when you're in a systems approach. This is why personal decision-making hits very few strategies or paradigms.

The third problem facing society in the future is that we have a great deal more information to deal with. I want to talk about that just a moment because that's been mentioned many times. There's a condition in decision-making called "perfect information". That is when a decision-maker knows everything there is to know about that particular choice. Obviously, it almost never exists in personal choice-making. However, a decision-maker is often not in control of the information he or she gets. Even if you had a choice of what information you could have in order to make a decision, most of us are not trained to make that kind of a choice. I think the role of information is a crucial one and there's a lot to be said about it in the present and the future. It's been said that when public education started, or at least some years ago, this society was information-poor and experience-rich. And, therefore, the goal of public education was to provide vicarious experiences and present information to the students.

The suggestion is that now the youth coming to our schools face the situation of being experience-poor and information-rich. The trouble is, we're still teaching as if the students were information-poor. It's not hard to recognize that students coming to your classrooms have been bombarded from the day they were born with all kinds of information. If knowledge has been doubling at the rate we hear it is, then our society is certainly full of knowledge.

Maybe one of the problems of education, then, has to do more with teaching us how to handle, to choose, and to select information. This was suggested also earlier. If we just talk about technology in agriculture, is it possible to teach people all there is to know about the technology of agriculture? One of the lessons we might be providing is skills in selecting and utilizing information. In an information-rich society, you should have a system that is receiver-controlled, that is, information-giving, rather than source-controlled. Public schools very often provide source-controlled information. We provide information to our students that we choose. Maybe what we need to do is to help students learn how to select the kind of information they want and they need. This is a difficult process for education, quite different from providing information that we choose.

Quickly, let me suggest some of the issues that I've perhaps just touched on in the outline that you may want to ask more about. Obviously, they are the computer, data-processing, and the rapidity of processing information. These are going to be tremendous factors in even how people choose. You can now put information into a computer, and predict future outcomes, or predict likelihood of success. The problem again remains that the decision-maker needs to clarify the desirability of these outcomes for himself or herself. And that's what the panel is doing. There are many techniques developed now for forecasting the future, some very sophisticated ones. It's been suggested that one new role for school counselors might be to help decision-makers look at and forecast several plausible future scenarios and to pick the one that they want to work with and make their decisions accordingly. This is a different kind of role for a school counselor than we are used to seeing.

Something hasn't been said at this conference yet that we should say something about--the work ethic. The question must be raised whether this country could support it any longer or whether it even exists. I read just recently that there is perhaps a growing change from the four-letter word "work" ethic to the six-letter word "growth" ethic. And it may be that the youth of today selecting careers or work (to take a broad sense) might be doing it more in terms of their own personal growth than in terms of work production or economic terms.

I think there's also going to be increasing concern as far as consumer awareness against individual and group testing, one of the major tools of career guidance and decision-making, and the harm brought about by testing. That will probably continue to be challenged.

Another trend to consider is the role of leisure, education for leisure, and of course, its relationship with work. Leisure is now thought of as the reciprocal for work. It may be something quite different for the people of the future.

The role of information and values, as well as the problem of uncertainty in decision-making are key factors that could be and should be included in a curriculum designed to help students learn how to help themselves as they grow older.

Let me finish with something I think will illustrate the intricacies of values and decision-making and the problems of accurate information in making career choices. Again, it has to do with Charlie Brown and Linus. One Saturday, Charlie Brown asked Linus that one question that every little boy gets asked, and every little girl will from now on, I guess. Charlie asks, "What do you want to be when you grow up, Linus?" Linus says, "Well, I'd like to make a lot of money, but I'd hate to be a snob. I've given this a lot of thought." "So what have you decided?" Charlie asks. Linus says, "So, I've decided to be a very rich and famous person who doesn't really care about money and who is very humble. But he still makes a lot of money and is very rich but is very humble and rich and famous." This, I think illustrates one of the greatest problems in career decision-making, that is, conflict of values. You may know very well whether you want to be rich or famous, or which one you want to be most, but a lot of times we don't know.

Linus goes on, undaunted by all this. He's decided to pursue a career in the cattle business. So Charlie asks, "And just how do you intend to get started in the cattle business, Linus?" And Linus says, "Well, I think I'll write to the Secretary of Agriculture and see if the Agriculture Department gives away cows. I'm not sure, but I think if you belong to 4-H you're entitled to all you want." He says, "I realize I have a lot to learn." Charlie says, "Yes, I think you have." A little later, Linus has narrowed down his career choice. Now he says, "I've decided now to become a Polled Hereford rancher." He says, "Look, here's a picture of a bull that sold for over four thousand dollars. Isn't that terrific? I could become rich and I wouldn't have to sell very many of them, either." He says, "Just look at this. Think how much money I'd make if I only sold as little as one bull a day."

Thank you.

--Edited by Richard M. Foster

INTERACTION III: H. B. Gelatt and Robert J. Havighurst

Listening Panelist: You commented about us being experience-poor. Would you elaborate on that and tell how we can overcome being experience-poor?

Gelatt: That has been a problem in career choice. A lot of career education programs are designed to do that--trips to factories to give some kind of firsthand experiences of occupations, let us say. We said in the past people grew up watching their father in his occupation. That was a limited range of experience. Career education programs design movies and vicarious experiences to give students a chance to experience a number of careers. In our own school district we have a fairly elaborate program we call "exploratory experiences program" where we have some seven to nine hundred students who are out every semester, experiencing an occupation with somebody else--on a research post, in a sense. It is one way to increase the opportunity a person has to experience what a career is like that you do not get from just growing-up experiences. There is a growing concern, or a developmental trend, that people sometimes get careers in organizations rather than in categories in industries. For example, you belong to a corporation or organization and may change careers within that. But, how do you let young people get experienced in knowing what the impact of an organization is like upon a person's life, life-style and career development? Because organizations do become very powerful and a person's life-style does become adopted or related to the particular organization they belong to. They might start out as an office boy and move up into various different quite unrelated careers but within the same organization.

Listening Panelist: Dr. Havighurst, I would like for you to comment on this. What are the implications of the high unemployment of youth? For the program of education that we should be carrying on...in terms of the kind of program, the extent in terms of years, and so forth.

Havighurst: As I indicated, it seems to me that our society, our federal government, is going to be under tremendous pressure to find something useful that young people can do, that will be useful for society and will be a maturing experience for them. This will be a part of the bill that we will pay, because we will get services that we otherwise would not have. So in a sense, we have to say that our national standard of living might go up with a national service corps, but nevertheless the taxpayer will have to pay for it. Now Dr. Tyler and I and others have been working pretty hard on what we call service learning or action learning. We all know there is a whole range of kinds of experience that young people can get as interns and in county government, let's say, and as workers or assistants in a child-care center or in an old people's home. There are a number of school systems that have programs in high school including agricultural credit. Portland, Oregon, for example, will give one-fourth of graduate credit for off-campus learning. I think we might get into this pretty heavily. Most of this now is done without pay and is just regarded as desirable education for young people. I do not want to steal Dr. Tyler's thunder. I am sure he is going to get into the objectives of education for youth in the quorum on Youth Transition to Adulthood.

Listening Panelist: Extend that to a program of education with a combined program of employment.

Havighurst: Even without paid employment we need this kind of realistic experience that so many of us got with summer jobs or part-time jobs. They are an important part of the education of young people--contact with people of other ages. The problem with people going to college is, it tends to be age-segregated now, as well as to some extent, class-segregated. Young people now need a variety of experiences with people of other ages--especially those of other cultural groups and so on that you and I probably got and were paid for.

Gelatt: There are a couple of terms, too, that might address themselves to that--the broadening of our notion of what work is--away from the production and paid, as well as the broadening of what our notion of education is. There is a lot of this in evidence, in that we no longer have to think of education as those many hours sitting in the classroom with instruction. We enhance the value of learning experiences and we enhance the value of doing things that used to be called "work" to overcome this.

Listening Panelist: It appears to me that if we do this in education's advisory work, experiences along with an educational program without pay, we may be accentuating the unemployment problem of youth.

Havighurst: It is very important to have a program that does not cut into the labor force and it can be done. It has been very carefully analyzed in several communities. Some two or three years ago, we had people go in and handle this problem--large social agencies and civic agencies. They asked, "What kind of assistance can you use that you cannot really justify in terms of your budget?" and so on. We found about four million work experience slots available. Over a period of five years, this would cover about twenty million people. In effect, one in five young people could have been put to work who would not have cut in on employment. They would not cut in on employment services that we would like to have but can not pay for now.

Listening Panelist: Well, how do you justify giving them experience in services that they cannot make a living with?

Havighurst: I do not justify it. This is a necessity. I suppose necessity justifies it. If you will tell me how you can expand the labor force to cover the twenty percent of unemployed young people under twenty...

Listening Panelist: (Jokingly) I am the listener! You are the expert! (Laughter) You are not supposed to ask the questions! (More laughter)

Havighurst: For the next ten years, I do not think we can because of that forty percent rate--forty percent of the population between fifteen and twenty-four, twenty-five and sixty-four and only half of that number going out of it every year. In effect, you see, you have two people trying to break into the labor force for every one retiring. After 1985, this trend will reverse. I wish I could see an alternative. Of course, if we had a war or something, that would take care of it.

Listening Panelist: There is an exception in the health care field--a lot of unpaid intern care--whereas in other fields there is not. I guess it gets into an assumption of change in wage and hour laws which is very difficult to do. Or is it an assumption of cooperation from the community?

Havighurst: Well, actually, with this analysis we had before, about a million of them were in child care, old people's homes and so on. I will give you an example. In the case of Portland, the state park about twenty miles outside of Portland, Oregon, has been taken over by the school system to build a set of trails, a little cookout area, and then some cabins.

The kids do that now. Junior high kids built that. It is a service to the whole community and one way of showing that this can be done. It looks ingenious. Chicago is full of things that ought to be done just to keep the place a little cleaner. Every big city is full of these things. Even though we have a better garbage disposal system than New York has, we still could do something about the beaches and the alleys and so on. So it is clear that one could not expand youth's services at the cost of jobs at the present time. After 1985 that rate should go down very rapidly. In the end, I am hoping we could learn some ways of helping young people get a variety of experiences that would be maturing. But probably in ten years we have reason to expect the economy could be paid for some of these things.

Listening Panelist: The big problem there is that it is the teacher who gets the most experience. It is not the kids. I think that is true lots of times. The teacher is the one who learns the most.

Havighurst: The superintendent of the Evans township high school we have studied and I went to Portland and spent a week there and in Minneapolis and looked at a variety of situations there. I admit we learned something. There is every evidence that these young people--boys and girls--were learning a good deal in a number of Catholic parochial schools in Minneapolis. The Sisters there were well-organized. They have a course which they call Civic Ethics, and the children have to take that course. Then they are permitted to volunteer in a variety of areas and most of them do volunteer, but they have to evaluate their experience. Those evaluations are rather carefully gone over by the teacher. As you might expect in a Catholic school, it is considerably more organized and in a sense, more authoritarian, but these youngsters really have a formalized maturing experience that they would not get if they merely studied social ethics in a classroom.

Listening Panelist: Can an educational program be held accountable for the occupational choices and career choices that are made available?

Gelatt: Can an educational program be held accountable? For the success rate, you mean? Well, I am going to dodge that a little, but only to suggest to you my point of view about learning and evaluating the success of learning decision-making. One way you can think about a good decision is on the basis of its outcome. Did I get a good job some place on the basis of the process you used in doing this? If you are teaching students to help themselves and how to learn to think for themselves and how to be independent, I would want to be held accountable for that--moreso than I would for, say, the number of people who achieved jobs in a particular engineering job in agriculture. Well, many people will not agree with that because of the problems of management by objectives. If you are aiming to have your graduates be most successful in the outside world and are going to be held accountable for that, I might choose both my graduates--my recruits--and my program design aimed at that outcome, which might be quite contrary to helping them to become wise independent autonomous people to help themselves. And you get into that trap. We did a study at AIR for the Army on ROTC. They were concerned about the commitments to Army of ROTC recruits. It was interesting I think because we found a lot of things, as a study would, about the kind of people who come in who made good Army, who were committed to the Army. A philosophical question going through my mind would be, if the Army wanted to have more people committed more, they could, of course, pick those people more likely to be committed. But what the study found was, I guess, one of the surprising things. As important as some of the demographic data about the people (the recruits) was their values and attitudes. So another thing you do is either pick those people with those values and attitudes, or be sure you train them while they are there to be a committed officer, and I think when you are aiming toward those kinds of objectives and outcomes, you might have quite a different program. So I think, in a way, my answer would be "no" unless that is what we believe most. If this panel decides what we believe most in agricultural education here in Iowa is to have good graduates for the most successful occupation, then I would probably want to be held accountable for that, but I do not think I would like that as a goal.

Listening Panelist: If you were going to give parents of students a choice whether they would want their students or their children to be good citizens or to be proficient in some occupation, which would the parents choose? Then if you were going to give the same test to the students, which would they choose?

Gelatt: If you had a choice between being a good citizen and being proficient in an occupation? Considering these incompatible, I guess... I do not know. If you are asking me what data we have, I do not know that we have data like this. Obviously, those often are two goals of education that have come out. One of the problems, of course, is what is a good citizen? You have quite a different opinion sometimes between the student, and the parent, and the teacher on that. I do not know that I would be able to choose between those or make a guess as to which parents or students would choose.

Listening Panelist: You made a comment on letting the students have a choice, I believe, somewhere, on what they were going to do. I wondered--did you mean during school time or career choice?

Gelatt: No, this has come out here today, also. The notion of consumer both in science and the decisions about nuclear power, agriculture, food, etc. There is a growing movement that the student of education and the consumer of foods are gaining more and more control over the power of decisions that affect them. We were lamenting this morning that many of the consumers do not have the information that the scientists have about it in order to make such decisions. I think that is a problem. It is true also for students. We have a strange phenomenon in education almost where we expect students to learn how to make decisions by being told what to do. And so we are constantly having to make that balance. When do you turn over decision-making power to students? At what point? Out in California and in other places here, it is not a question of that any more. They marched on the administration building and took it away. More of this will occur if you do not develop some means of involving the students in the decision-making process.

Listening Panelist: I would like to hitchhike on that a little bit. I think we have heard all morning and afternoon that we should be emphasizing helping students learn to make decisions, to learn where to find information, where to get it, rather than the emphasis being on the technical subject matter. Evidently we have been emphasizing the past too much--the technical materials and not these other viewpoints. What will happen if the school systems would convert this? Will we still come along with strong technical subject matter if we get teachers to start teaching on the basis of making management decisions? Selection of materials and this thing and just disregard the technical materials?

Second Listening Panelist: I think the emphasis I hear is the promoting of what we call the problem-solving method of teaching, where you look at the situation, you see what problems need to be solved, you see possibilities, you gather the information, you use the technical information, practical information, whatever you can get, and help the students go right at the seat so they can put it into practice in their occupational experience program. And if they do that they learn how to think, they learn how to solve problems and they will help to make decisions in terms of career choices. I could not agree any more. I hope that was what you said!

Gelatt: It is what we said. The trouble is, I do not think anything new has been said in education for fifty or a hundred years. The main purpose ought to be to teach students how to learn how to learn. In a sense, we are saying this: Here is the problem worth emphasizing. (We are not disregarding technical education.) I will show my ignorance of your field, but if you will allow me to use Linus again. Say you are going to teach Linus how to be a good cattle-raiser, and you teach him all the technology there is. In that sense, you have at least two problems. One is that you are predicting again in the future that when this person finishes school, he is indeed going to continue in the cattle-raising business and therefore is going to use all this technology that he has learned. Secondly, you are going to assume that that technology is still relevant-- if you are just teaching this person the knowledge that exists at that time. First of all, he may change careers a number of times. Or you are going to require people to make career decisions fairly early, earlier than they seem to be doing now, to be specializing. And then you are going to have to assume that that knowledge remains at least somewhat relevant to him in his knowledge or his occupation, neither one of which may be true.

Listening Panelist: I have a question for Dr. Havighurst with regards to the unemployment situation that we have with youth. With regard to the population of unemployed youth, what do we know about the characteristics of this unemployed population? Are there any common characteristics that they share? Do they have lack of skills? Is that why they cannot be employed? Or is it a motivational factor? Or is it an attitudinal factor? In other words, I think that has definite implications for the kind of problem or the concern that we are addressing here. And secondly, if I may hitchhike on that question with another point, if it should be skills, or if it should be attitude or it should be motivation and the way we get at that is we provide them an experiential base type of education where they go out and do a service-oriented type of experience which gets their heads screwed on right and they say, "Fine, I am ready to go to work," and the first question is, "Well, what can you do?" They say, "Nothing, but I have a good attitude," where are we?

Havighurst: You undoubtedly know that the best study of youth in the labor force is the Pounds study at Ohio State. Pounds and his group at Ohio State have given us support now since 1966, following a national sample of young people, who at that time were fifteen or sixteen. They were interviewed every six months or so. They also followed a group of middle-aged women and middle-aged men, and got three or four studies through the school of human resources at Ohio State. It is clear here (remembering this is an abnormal situation) that the person with the best motivation and skills is not likely to experience any difficulty in getting a job. But suppose she wants to become a teacher. So he tells her to stay on and get a Master's degree and that sort of thing. Clearly, at the present time, the main thing is skin color. If you are black, you have twice as good a chance of being unemployed at the present time, all other things being equal. And it is urban-big city where a lot of unemployment is. Apparently in the smaller communities, there is enough work. I wonder what it is.

Listening Panelist: I cannot quote the exact figures, but I think you are going to find the unemployment rate of youth higher in some poverty-stricken rural areas than you will find in the big city.

Havighurst: Well, I would agree on that. Appalachia is one...I was thinking of more like here in Iowa. I doubt that the unemployment rate of youth is very high in towns under 10,000. In Appalachia, they usually just eke out a subsistence living or they go to the big cities as they have been for fifteen years. There is no question after about the age fifteen for about the last fifteen or twenty years, you have an enormous migration of young people out of Appalachia into the cities. But you do not see this in Iowa, Missouri and Illinois, where there are more opportunities.

Listening Panelist: But that is reversing now. Because they are unemployed in the cities, it is costing more to live, so if they are unemployed they might as well go back home and live at a cheaper rate.

Havighurst: Do you have some data on young people going back home?

Listening Panelist: Yes, back to the Appalachia area, because the cost of living is less there.

Havighurst: Could very well be true, if there is good relief. If you could get any relief in Appalachia. That becomes the question then.

Listening Panelist: I have one more question in relation to something that Dr. Gelatt commented on already in relation to the readiness of youth to make a meaningful occupational choice. Many of our programs today prepare students through exploratory programs to make better decisions. At what level does it seem to you we stop exploring and start moving into the specialized skill-training?

Gelatt: I am sure that is going to vary on location, the student, and type of career and occupation. As you can tell, I am reluctant to suggest a highly specialized vocational educational program for a person preparing for a life in the future that we are looking at. We have already mentioned that we do not know that those careers are going to be needing those kinds of skills. I suppose, certainly at the university level, there is a time for some kind of specialized education. How much specialized education are we calling for?

Listening Panelist: Can you back that up with data? The reason I ask is because I have read some articles recently, and I do not know how factually sound these articles are, about the noncommitment of college students to a particular career. They are there because there are no jobs. They are there because in many places in the nation, it is still the thing to do--to go to school. They are there, but as far as a firm career choice, they have not made one.

Gelatt: Well, we are talking about a specialized school--a vocational school for one thing. A person in that has already made some...

Listening Panelist: Oh, post-secondary, you mean?

Gelatt: Yes.

Listening Panelist: Okay, I am sorry. I misunderstood.

Gelatt: But also, that is an interesting point. One of the reasons for selling college education used to be increased employment earning power, which is not holding up as much now. We either need to get different reasons for people continuing on to school, or there may be a change in the goals of some of the youth in relation to work or meaningful experiences after school. Whether economics, that is, high salary, will continue to be the powerful incentive is not known. I do not know if we have any data to support that, but it is certainly worth speculating that there may be other factors as incentives to career choice than high incomes.

Listening Panelist: Our own institution has this follow-up of a project now I have been meaning to bring up. The report was on a group of fifteen-, sixteen-, and seventeen-year-olds in the 9th, 10th, 11th, and 12th grades in 1960. They were originally studied in high school and are now in their thirties. Young people do not get their first job generally that is highly specialized except in demography, typewriting, barbering, or cooking (that is, as a chef, or something). The area of young adult's education did not specialize until he was twenty or twenty-five--twenty-five or thirty or thirty-seven years of age. He started in an unspecialized opportunity, got stuck there with stenographers, bookkeepers, and people who had a specialized program in the high school or in the community college. I think that is relevant to your question. Specialization usually developed later in continuing education or the person went back to the community college or other place to get this training.

Gelatt: I think there is a need for the term "specialization," and is specialization synonomous with journeyman-type of production? Because using that same line of thinking, then, I find it difficult to suggest why, in the state of Ohio, at least, those who have vocational education who go on to the labor market have a higher employment rate or a lower unemployment rate than those who did not go that route. This tells me that skills--entry level skills--have some effect or some influence on kids getting jobs.

Listening Panelist: The Systems Development Corporation, in a study out in California, found that the great advantage of occupational programs was the connection with employers--it is knowing somebody. They found that very rarely anybody under twenty-one ever got a job. I am on the Governor's Committee for Youth Unemployment. We found that the sample of employers that we interviewed said, "We wouldn't employ anybody under twenty-one, and this we can justify because there are so many older people unemployed. The only young people we really employ are those who have a connection. A friend of mine will call up and say, 'Can you help my son? He has decided to drop out--into something.' We can do that but we cannot employ young people generally, because the ones who employ other people will not employ anybody under twenty-one at least."

Gelatt: You have raised some real good questions. I wish we could continue, but they have me on schedule, too. I will turn this group back to the chairman.

Dr. Crawford: In reference to a question raised by Dr. Havighurst in his speech, I have the up-to-date figures on the vo-ag enrollment for some of you. For 1970-71, that should be 560,000. For 1973-74, it should be 659,000.

--Edited by Richard M. Foster

NEW MORALITIES AND OLD: A RECONSIDERATION

Dr. Paul Holmer

I speak with a little dissidence and shyness to a group like all of you--I take it all of you know what you are doing. I keep trying to decide that from day to day! I have learned a certain boldness so I shall exercise that for the next forty minutes. I want to talk about the new moralities and the old, because it strikes me that we are in the middle of a period on moral questions that is deeply confusing and produces a certain amount of skepticism among the learned, as well as among the ignorant. And it seems to me also, that the contribution of the group of learned people--that is, of the intelligentsia that some of you have been praising so much today (I have been in the racket long enough to think that it is not an unmitigated game)--can take a culture fifty years to get out of. I feel this way about some of these moral issues, also. So I am sorry if I strike a sour note, but I tell you this is one of the things that will be obvious enough.

Now, let me divide my remarks into several kinds. First, I want to make some general remarks about the moral issues, and then say something about the new morality, or new moralities and consequences thereof. And secondly, something about what I am going to call euphemistically the old moralities. I have lived and you have, too, I take it, through a period when every stripling in the university felt himself morally qualified to speak in grandiose terms about the war, about ecology, about the future of mankind, about this, that, and the other thing.

We have lived in a time when we have had a new morality created, or a new moral spirit created, in our presence. A new spirit that has created what one might call a widespread "moral consciousness." It looks as if large numbers of persons have been morally sensitized. I take it as a sign of being moral, that one learns to intend and refer to everything with somewhat wounded conscience. We have had that kind of quazi-moral consciousness created for us in these last fifteen years or so when there has been a range of poverty issues suggested to us, when people have been critical of the use of power of various sorts, and when the questions of distributed justice have been widely raised. By distributed justice, I mean people concerned about how we are going to dispense medical care, educational opportunities, love, sex, money, and food.

An easy kind of moralism has developed, partly in consequence of vulgarization, and partly also in consequence of a popular pedagogy. A kind of "pop" culture, too, has created a notion that one of the easy ways to become a moral person is to vote right and become a liberal Democrat, I guess. It is as if the easy way now, as against old morality, is to become cognizant of all these quazi-moral factors that are supposed to permeate our society. And that kind of cognizance, most people get by just the thin veneer of talk that is floated over our society. Relative to that also, has been a widespread enthusiasm for teaching everybody who and what he is. If he is a part of a minority, then that will help him gain his self-identity. If he is this and he is that, then whatever group or part he belongs to then is also a sign of his morality, and he now speaks the interest of that group. In consequence of that, we have had interest groups speaking like mad on every public issue we have had. It is not educated, but simply a gabby group on any subject you want to mention, that are supposedly articulating their interests. The pop culture has been so rich in easy assimilation of all this moral notion that anybody who does that is credited almost in advance with being morally serious and morally sensitive and morally earnest, etcetera.

Now if you ask me what amounts to the new morality in that kind of situation, then that would bring me to my next major assertion. Namely, that the new morality that goes with that is a widespread proclivity to think that being moral is a matter of adopting a policy and policy considerations--for groups, for nations, for professions, for usually large constituencies. But in any case, adopting a policy for some large constituency perfectly, for the U.S.A. if not the world. It looks like the way in which you now become moral. And having a defensible public policy of whatever sort (preferably the sort that is going to be for the good of mankind and right rather than wrong) gets to be a kind of popular moral posture into which people move without crisis or personal turmoil.

If one can believe Socrates or Aristotle in the ancient world, they thought the young could never be--should not be--taught morality, because morality was so personally experimentive. But in our day, morality is positively cheap. You get it by exposure and sort of heavy breathing; this tendency to be preoccupied with questions of public policy, and nothing less than a general critical attitude toward everything, and our high sensitivity and suspicion toward everybody and anybody who is in authority. That, I say, has come very cheaply and very quickly and has come to large numbers of people.

It is a surprising thing to me that that also passes as being moral. I take it there is a somewhat deep cause for that. I do not wish to discuss the psychology of contemporary generations... do you want me to kind of sum that up? I think there are deep etiological factors that permit that. I think they are twofold. Since the creation of our positive conception of government legislation in what one might call, broadly speaking, the Western liberal tradition--where one thinks about legislation as an aid to the public good--you get a highly institutionalized situation. It begins to look as though the government is, as John Stewart Mills says, that government and legislation have to aim finally at the wretched social arrangements, whatever they may be. Their actions are usually thought to be a moral credit to them.

And you know, as I do, that most religious people have not been able to resist them either. So-called liberal churches of various kinds are usually populated by ministers (if not laity, surely ministers) who love to turn religion into a stimulus that will also aim at all these vandable and wretched social arrangements. So we get a clergy that has a lean, hungry look like Ian Cayher, who have an eagle eye for current affairs and a strident voice who expostulate publicly on Sunday about local evils that could be mended. So with most people, if they become morally sensitive and morally responsible is always to be where the action is.

I have had to speak a year or two ago to a group of clergymen, all who left their parishes because there was not any action there. They went to Washington where the action is. There were several hundred working for bureaus and outfits in Washington, I am sure, because they are convinced that legislation is the way to get things done and getting things done is the new way now to be religious, to be moral, and to be responsible. I think that is a kind of travesty, of course, upon the religious life. It is understandable and it is one in which people have slipped and they slip into it with alacrity.

There is another factor that is also deep and it is one that I want to note in conjunction with many things that have been said here today--and that is that in the last century or two, not only legislation and government power have been used to change the wretched social arrangements, but we have developed the notion that the life of learning--and especially the accumulation of something called science itself--can harm us with not only disintegrated apprehension of things but also with a capacity to change all sorts of things.

Learning is not only contemplative, but it is also activistic and should be an instrument for productivity. When you get that, I think you get a new picture of what learning does. Learning along with legislation tends to create a sense of restlessness among learned or quasi-learned people. It looks as if learning itself is not socially complete unless you know what to do with it. It is as if learning is not something to be treasured just in and of itself. You have got to do something with it that will make it right and good. And once more we are plunged into the notion that we must have policies if we are to regulate with order the learning itself. And so also we must have policy and it looks like moral policy in order to make legislation responsible and efficacious.

I allude to the fact then--which is by this time, blatant, if not obvious--that the creation of something that one might call a new morality is this morality or this moral temper in which the creating and sustaining of an interest augmented in the direction of a policy looks like the heart and substance of being moral. And it is not just one group that says that, but it is all kinds of groups and all kinds of people and all kinds of circumstances. In fact, that is so easy to come by that most people have not attained that with effort, and they have not concluded that in virtue of intellectual toil or anything even resembling what one might call moral understanding. Instead it is a kind of sociocultural posture into which people slip without reflection. It seems odd to me that the moral tradition which has been so introspective--the life of moral learning as we have it from Aristotle to Socrates and down through the lives of many great geniuses, as it continues in our own time--has not been focused on the oddness of that and the ease with which many people accommodate themselves to that state of affairs.

Now let me say something about the consequences of that new morality. That new morality of course has created a great rumpus and a format which makes criticism easy and plausible. It unleashes countless critical demeanor. But beyond that it seems, too, there is something a little more momentous. If you begin to take seriously the interest of the educani (whoever they are), the interest of this group and that--special interest groups--you begin to consult all of them and you now think the formulation of the moral policy is going to be done by gaining a kind of consensus of all the interest groups. If that is the way your morality is going to come about, as I think most people believe, the difficulty, it seems to me, is that getting a consensus of the interest groups is fantastically difficult. And the odd thing about that is that this new way of thinking about morality--that is, if morality consists in defining a policy on anything that either legislation or learning can command (learning, whether it is scientific learning and all the sorts of things we have been learning about today, or whether it is legislative possibilities, whatever they are) is not only do you have widespread disagreement, so that you achieve a new kind of skepticism, but deeper than that, you begin to settle for a picture of human life that is terribly average.

Well, maybe you do not think it is that average. But it is the kind of life in which goals and aims of human life get to be things like the resolution of poverty, the achievement of whatever you are looking for, justice or society and ecological factors and so on and so on. You might get all that.

Now the difficulty with that is, and here is the moral point, in the middle of a widespread social consensus like that, to sort through our colleges and universities in which legislation and education look as if they were leaped now in the formation of supposedly new socially responsible policies, we also developed one of the most striking instances in modern science of our counter-culture. People who were dropping out of all that. Not only dropping out of the crudities of capitalism, the inanities of governmental policies of which they disapproved, but also dropping out of a whole society in which legislation and, for that matter, most so-called scientific endeavor when it is housed ethically. Dropping out of a conflict in which that kind of mediocre picture of human happiness simply was not enough.

I take it that for a lot of people, if the achievement of morality is simply going to lie in policy questions and policy achievement, that what you can do by the way of legislation and what you can do by way of the application of the best of human learning--science or what have you--is hardly enough for human beings. Human beings are also happiness-oriented. Every human being wants happiness. The need for happiness is so deep and so profound that it does not even need justification. We cannot conceive of a life that is not interested in human happiness. You find a life that either has the promise of happiness or is radically unhappy and we feel that that life really is not human. But the question I take it is, what is the character of that happiness?

When you begin to settle, as we have in the modern new morality, for that happiness to be achieved by a kind of social legislation on one side and by educani and professors and maybe literati, too, but anyway you settle for what they can do with their crafts whatever they are and those crafts, either cognitive or legislative, are productive of a strikingly mediocre mode of life, as it never produces sainthood, never produces moral heroism, never produces extravagant individuality. It produces all kinds of things and may alleviate poverty, but the alleviation of poverty is not the same as being happy. It may not even be a fundamental condition--for at least all the forms of human happiness and some of the deepest forms.

I am not saying that--that has been the moral tradition that has said that is the point of the humanistic tradition that centuries long that continues that humanistic tradition that is not even culturally indebted; that makes, for example, the pages of Aristotle's Ethics as appropriate to a twentieth-century reader as it was to a person in Athens three hundred years before the time of Christ. So I suggest to you now, in that kind of situation what we discover all over again is, that whenever you start to program the human situation and plan it and whenever you get a kind of working consensus like you have nowadays in this pop society of ours, this somewhat kind of synthetic social conflict in which we are all living and dominated by the educated and the legislator, and start to fit your moral life into that and think that your morality is going to be simply one more addition to the engines of the society or that your morality is just going to be a policy statement as to how the engines of society are going to work, strikes me that we are settling for much too little. People are not that small.

I have met the fact that means the old moralities start to loom up again. The old moralities have always said something else, and by old moralities I mean the moralities of Spinoza, of the Christian and Jewish traditions, the moralities of Aristotle and Socrates and Plato, the moralities of Samuel Johnson, the moralities of the great novelists, Tolstoy and Dostoevski, the morality of the large range of thoughtful and deep people. But that kind of morality does not always lead to a clear-cut consensus, but tends to bow out something like this. The big task of morality is not to chooose policies and policy statements but the big task of morality is to cultivate people. Cultivate people who could cope with a huge range of circumstances.

A picture of the old morality does not produce a social policy that could be conjugated around all the grand, eloquent detail, but rather to create people. People maybe who would be virtuous. People who would be courageous in a wide range of circumstances. Who would be just in an ad hoc way, just even without principle. Who would be temperate in the middle of temptation. Who would be kind. Who would be resolute. Who would be courageous. And eventually who would be so at peace and so content that one might even dare to call them happy. It might be happy even in the middle of injustices that they might have to face, and demands that are overwhelming and suffering that is well-nigh unbearable.

The notion that morality consists in relieving all suffering seems to me is one of the illusions of the twentieth century, that we could even begin to know enough to tackle and relieve all the agonies of mankind. It seems to me one of the reasons we have so many people who now think that the popular morality of the sixties and the popular morality in fact of the liberally-educated group of the last fifty to one hundred years, that that is sort of a matter of sucking air and an optimism that, if you are not prepared for the breakdown of that and morally armed so that you could live in a conflict, which will not eventually be in such grandeur and social completeness. If you are not then, you do not begin to know what moral cultivation does.

I am a little unhappy therefore with the easy identification that sometimes takes place. We get this identification of legislation or we get an overlap of legislative consideration, particularly nowadays, pictures of science and all that science is going to be able to do for us, and then, as one of the speakers said today, put that together with all these interests of all these groups, and it looks as if you have got to have a systems orientation computer mentality feeding everything in. Well, I wonder if there does not have to be room left by legislators and/or top scientists who want to be so achingly helpful.

There used to be a kind of tradition in which the old morality was not identified with science and legislation. It was identified with the deep personal culture and also with humanistic tradition. A humanist tradition which the aim of the humanities, as I take it, in the past, in the liberal education, including the sciences was something like this--that the aim of the sciences of the humanities was really aimed to make a person continually capable of wonder, have a zest for life, a feel for marvels, an adventure, a kind of intensity of the imagination, a capacity for admiration. That was a picture of how a person would be if he were liberally educated.

If the aim of morality makes any sense, the old morality strikes me as continuing that. In fact, liberal education should make one wondrous--capable of things I have mentioned, but a morality would also make one capable of overcoming fickleness, of overcoming his sense of being ill-at-ease, his cruelty, his inability to cope, and instead would make him (as I have already suggested) resolute, just, temperate, kind.

I would be amiss if I did not also say one thing in virtue of a close, personal enthusiasm as well as a professional commitment. Namely, it strikes me that the religious tradition (of which I stand as a kind of representative) itself is malformed when it is made simply one more instrument of American culture, which is simply for the creation of the rights and the so-called correct social policy. It is not malformed if the religious tradition, along with the moral tradition, along with humanistic learning, none of these are malformed if they tend to aim and create a capacitated and an enabled human being whose morality would be evinced by the fact that in the middle of the nonsense, sophistry and plain old-fashioned "bull" that he would have a feel for integrity, that he might love something good rather than something expeditious and to deal with "bad." And that he would be the kind of person, finally, that you could bank on.

In short, that would mean the upshot of the new morality is they want you to become a character. Obviously, we still need quality, but it strikes me that Aristotle had it correct, that ethics produced character and that questions of policy were, finally, matters of politics.

--Edited by Richard M. Foster

LABOR TRENDS AND NEEDS OF SOCIETY DURING THE NEXT DECADE

Rupert Evans

You will note that there has been a change in the batting order. I originally was scheduled for fourth out of eight today. Fourth in the batting order normally is the clean-up spot and they put the person on last who is regarded as being a weak hitter. I hope you won't regard that as prophetic! Being last is nice, in spite of facing the task of trying to keep you on the panel interested and continuing to listen after this barrage today. It is interesting to see how some of us can take the same data and arrive at considerably different emphases. I have the benefit of having heard some of the rest of you. I won't draw on the same data base as the speaker who immediately preceded me (Paul Holmer), but you will find I have drawn on the same basis that several of the other speakers have used.

Really, my talk today ought to be called something like "Implications for Agricultural Education of Changes in the Labor Force." I may be a bit more directive than some of the preceding speakers. This will give you a chance to react both negatively and positively to some of the things I am suggesting for agricultural education for the next few years.

I want to talk primarily about two things it seems to me we have seen as being verities for the past hundred and fifty years and they are things I think are no longer true. One of these is that we have almost continuously had a surplus of youth in the labor force. I think that will no longer be true, and I will try to tell you why I think so. It has also been a verity for the past hundred and fifty years that the best thing you can do in reorganizing work is to replace labor with machines. Or to put it more pointedly, in terms of what I am going to be talking about, we have seen it as being desirable to replace human power with fossil power. I think that, as with the farmer, is no longer true or soon will be no longer true.

Now vocational education is concerned with preparing people for work in such a way that work is possible, meaningful, and satisfying to the individual. We use, as partial guides to the structure of vocational education, some labor force statistics which are aggregations of data which have been collected from individuals. Then we add these data together in ways in which the aspect of individualism disappears. I still think these data are important for individuals. I want to talk about some of the ways in which these data indicate directions to move in vocational education.

It has often been noted that vocational education is more directly and immediately related to the supply of trained workers than it is to the demand for such workers. Some people have even gone so far as to say that vocational education should be directly tied to the current demand for trained workers, even though vocational education has no control over that demand. Now, the assertion that vocational education has no control over the demand for trained workers is an over-simplification. Just as an example--if there are no trained tractor mechanics, there certainly will be no demand for persons trained to manufacture tractors, or to sell tractors, or to buy and operate tractors. So vocational education does have some effect on labor force demand, especially in a negative sense. That is, the absence of vocational education can depress the opportunity for a wide variety of work. If you don't believe this is true, then you haven't examined developing countries where you see that this absence does indeed depress the demand for a wide variety of types of work. But today I don't want to talk about demand. I want to talk about one part of the labor force--supply.

Now, supply of labor has both a quantitative and a qualitative side. Vocational education has as a primary goal, to increase the quality of the labor force supply. And you folks, I know, have paid attention to that. So I am not going to talk about that today. But what I do want to talk about is the quantity of workers--and I want to talk about it even though vocational education doesn't have any control over it, because I think the fact that some changes in the quantity of workers will have an enormous effect upon the kinds of vocational education we can and should provide. This quantity of workers in the labor force is of prime importance to vocational educators, employers and eventually to consumers.

Very often we have had great revolutions in the work place that have occurred as a result of rapid changes in labor force supply. Dr. Burton pointed out that the world population is exploding. Some peoples in the world have, for a wide variety of reasons, done something about the explosion of birth rates. Most developed countries have cut birth rates sharply. Obviously this increases the amount of food that the people in these developed countries have available to consume. But, if carried far enough, cuts in the birth rate inevitably decrease the amount that those people can produce, particularly if these people don't have the energy to replace the manpower which is no longer available because the birth rate was cut sharply. Now remember that for the last hundred and fifty years, developed countries have deliberately moved to substitute machines for people. Machines that, for all practical purposes, subsist on fossil power. If you don't have that fossil power to replace people at work, then you have to do something about it.

Incidentally, I would love to test the hypothesis that the rice farms in Japan are lying idle because of the shortage of workers who are willing to work at a wage that is determined, in the long run, by the world price of rice. And I would also like to test the hypothesis that it is the opportunity to earn higher wages elsewhere and the shortage of young workers and farm land, which sells in Japan for as much as $500,000 an acre, that may be doing more to idle rice farms in Japan than the shift to buying beef at the current Japanese price of twelve dollars per pound. I will talk a bit about Japan again because it is an interesting case.

Now, decreases in the birth rate also mean fewer youth to educate. We see this every day as elementary schools are being shut down all over the country. Elementary school teachers are unemployed. The next to be affected will clearly be the high school. Inevitably, this is going to mean high school closings and consolidations, and fewer jobs for high school teachers. 1974 was the peak year for high school enrollments. From now on to the late 1980's high school enrollments will go downhill. It is interesting that in the midst of this, we have a shortage of ag teachers. I won't go into all the reasons that I know for that shortage (and I don't know all of them), but I'm darned sure that one of the reasons for it is what has been called the "cobweb effect." That, incidentally, is one of the things that bothers me most about career education...and you know I am a supporter of career education. One of the things that bothers me most about career education is that as we get and convey better information about better opportunities in the labor force, we create marked changes in the labor force. Whenever it becomes part of a common wisdom that there is a surplus of engineers, we dry up the supply of engineers and thus create a shortage of engineers. A surplus turns into a shortage because of the conveying of information that this shortage has occurred or is likely to occur. The more efficient we become with career education and transmitting to people the shortages and surpluses that now exist, the more we will participate in changing those shortages to surpluses and surpluses to shortages--but that is another story.

This creation of teacher surpluses in fields other than agricultural education has really begun to worry teachers. They see the changed birth rates, they see the existing unemployment of teachers, and we find in a number of states a very interesting movement on the part of the teacher organizations to lobby against funds for teachers' colleges, in an attempt to slow down the flow of new teachers who will compete for the jobs that no longer exist. We also see the interesting competition between universities, technical institutes, and community colleges for funds and for students because more for one of these types of post-secondary institutions means less for another. You folks are very well aware of this. But, as vocational teachers, we have to be aware of another kind of effect of changed birth rates. That is, another kind in addition to the teacher shortages that have been created, and will be created increasingly.

We need to be concerned about the effects of changed birth rates on the labor market. For more than forty years, this country has had the highest rate of youth unemployment of any industrialized nation. Since 1960 particularly, this rate has gone up sharply, until the current rate is almost twenty percent, as Dr. Havighurst pointed out. And as he also pointed out when somebody asked him a question about who is particularly disadvantaged--for young, black, female workers, the current unemployment rate is over forty percent. By anyone's standards, these rates are intolerable. But on the other hand, blessed if I can't come to any other conclusion that that it is a wonder they aren't higher.

Youth between the ages of 18 and 21 have the highest rates of unemployment among those seeking full-time work. In 1960 there were less than 10 million youth between the ages of 18 and 21. In 1978 this group will peak and there will then be 16.6 million people in this age range. Assuming that the twenty percent unemployment rate continues to hold in 1978 for this age group, then we will have 3.3 million unemployed. But if we have created no new jobs for youth between 1960 and today, the youth unemployment rate would be far over fifty percent. Somehow we have adjusted reasonably well to having six million more youth aged 18 to 21 in 1975 as compared with 1960. During this same period we have also created millions of jobs which have been filled by women who would in the past have stayed at home and remained outside the labor force. So the accomplishments in terms of job creation in the fifteen-year period have been enormous.

But what about the future? By 1987 the population aged 18 to 21 will drop to less than fourteen million. This means not only fewer students in high school and in the post-secondary schools between now and 1984, but it also means four million less 18 to 21-year-olds seeking jobs in the mid-1980's than are seeking them now. As Dr. Havighurst pointed out, this is a drop from about four million new workers to three million every year. A million a year that we will no longer have looking for paid employment. Even if we do not create any more jobs during the next ten years, we are going to be faced for the first time in this century, and maybe even for a hundred and fifty years, with a shortage of youth in the labor force. Now what does this mean for vocational educators?

One way of assessing this problem is to look at some of the other countries that have gone through something similar to this. Japan and Germany are perhaps our best examples of countries that have been facing shortages of young workers. Both had low birth rates after WWII. Both had rapid expansion of employment during the 1960's. Both have had extreme shortages of young workers. Now they took two very different attacks in coping with this problem. Germany imported young workers from southern Europe. Japan chose deliberately not to import any young workers. They wanted a homogeneous culture and were willing to go to just about any lengths to maintain it--even to the length of denying the existence of some subcultures within Japan.

Both Germany and Japan found that many tasks formerly done by young workers were no longer being done. In Japan today, a young worker is known universally as a "golden egg." Ask any Japanese what "golden egg" means, and he can immediately tell you. A "golden egg" is a valuable, desirable commodity for any community or employer. The attitude of Japanese society toward youth has changed markedly, and I suspect the attitudes of youth about their own worth have changed as well. Youth in Japan are optimistic and sure of themselves.

Similarly, German youth are self-assured. They know if employment declines, youth from southern Europe will be sent home and German youth will still be needed by society.

Both Japan and Germany have expanded vocational education rapidly. When youth are scarce, one cannot afford to have them unproductive.

What will happen here as we face shortages of young workers during the 1980's? The most likely possibility is that we will do as the Germans have done, and import young workers from Latin America. If so, we will need vocational instructors who are competent in Spanish, Creole, Portuguese, French--in these languages and in the Latin cultures that go with them.

It is remotely possible that we will follow a distinctly different model and use older women to fill the jobs formerly held by youth. If the youth shortage had occurred ten years ago, this would have been the most likely scenario. But women's consciousness has changed this. Older women will most likely be competing with men of their own age for the choicer jobs, instead of competing with their sons and daughters for menial jobs as has been the case ever since the end of WWII.

Regardless of whether we follow the German or the Japanese model or develop a model of our own, we are likely to see a confident U.S. youth labor force disdaining low-paid menial work and seeking vocational skills which will lead to higher paid production and service jobs. Regardless of which of these scenarios we follow, industry will demand effective vocational education for handicapped and disadvantaged youth and will be happy to employ them. Vocational education for young adults and retraining for older adults will also receive high priority.

While we are talking about this age group of roughly 25 to 39, this is a group that ag teachers are certainly concerned about. What about this age group of 25 to 39 which in the past has been a bulwark of the American productivity and stability? Well, one reason these people have been productive in the past is that they have had low unemployment. This is a striking contrast to the high unemployment of youth. People in this age range have had relatively low unemployment by our standards, but let's look at one of the reasons why it has had low unemployment. One reason it has had low unemployment is because there has been virtually no expansion in this age group. Let's look at the ten-year period that spans the 1950's, and at the people in the fifteen-year age group between 25 and 39. During the 1950's, this age group expanded by 500,000 people. During the 1960's it expanded by 700,000 people. During the 1970's, it will expand by 15 million people. Let me repeat...500,000 increase in that age range during the 1950's, 700,000 increase in the 1960's and fifteen million increase in the 1970's. That, of course, is because of this baby bulge moving on through into the age range 25 to 39. It looks to me what we are saying, is that there are plenty of people who are going to want to be young farmers, but there are not going to be near enough farms to go around.

Now back to the group that I'm most concerned about--youth. Vocational educators will have jobs in spite of the definite decline in secondary school enrollments and the probable decline in post-secondary school enrollments. Now we know it is going to happen in the secondary schools, because almost everybody goes to secondary school. We don't know for sure what will happen in post-secondary schools because roughly only half of the people go to post-secondary schools and it is conceivable that as the size of the group goes down, the rate of attendance might go up. So we don't know for sure, but the chances are enrollments are going to go down in post-secondary schools, too.

I am predicting that vocational educators will continue to have jobs in spite of this, but it means that the accountability of vocational educators is likely to increase. If employers badly need all of your graduates and your dropouts, you will be concerned about how well you teach all your students--not just the cream of the crop. Ag teachers in those high schools which are already too small, can expect no relief from pressures to fire teachers and consolidate schools to adjust to dwindling enrollments. The soonest that relief can come to the high schools is 1990, and it may not come then if family size continues to shrink.

Area, secondary, and post-secondary schools appear to be the only solution to provide necessary economies of scale. This, in turn, means that the day of the one-teacher ag department is nearly gone. It is already well on its way out, and this will be replaced by ag teacher specialization and a need to learn how to compete with--and I emphasize that--how to compete with, as well as cooperate with, teachers from other vocational fields. As you go into larger operations where they have several different vocational programs, ag teachers have to learn to compete in a way in which they didn't have to compete in the one-teacher ag departments.

Now, I have to qualify all this by pointing out that we will have an "echo effect." The echo effect will change this picture of youth shortages temporarily. The echo effect comes from the birth of children to the products of our baby boom. School population may go back up, even if these people only have 2.1 kids per family. If they have only one per family, then there may be no echo. Many predictions are that the birth rate will stay at about the same level so we will have an echo effect and a temporary increase, then, in young workers about the year 2000. I hope we will have made substantial plans for the critical period from 1985 to 2000. Because this is the period when I think we are sure to have a shortage of young workers.

I hope we will also begin to make plans for the period after the year 2000, when we may be beginning to reverse this process of using energy to replace workers and begin to replace energy by employing more workers. I have difficulty with this scenario but I just can't escape the likelihood that it will occur, so I hope we begin to make plans for that. Regardless of which of these scenarios comes through, it seems clear to me that we will have plenty to do in vocational education for as long as we can see--and I know I'm not going to be around here to see beyond that!

--Edited by Richard M. Foster

INTERACTION IV: Paul Holmer and Rupert Evans

Listening Panelist: Dr. Holmer, look down the road a ways and tell us what kinds of change or adjustment you see in the morality in the future.

Holmer: Well, I am not very good at predicting anything, but it is interesting that what people talk about is this religious interest among contemporary students. It is correlative also to an interest in the issues of the older morality--namely, problems of character. I have done quite a bit of work with some of the dropouts because northern New England is full of these little communities. There have been a surprising number of dropouts from the Yale-Harvard scene, not the least of which are the faculty children from the somewhat high pressure community they live in. In the Yale community, I am afraid, the sons and daughters of the Yale professors are virtually the ethos. They are almost forced to think that they would be moral failures if they did not get into Amherst, Williams, Harvard or Yale. There is no orientation toward the community college or towards a state university enthusiasm. The consequence being, (I believe it is a consequence), that a large number of our faculty families are deeply splintered families. It is not unusual at all to go to a faculty gathering and have the faculty compare notes on their kids who are major dropouts.

Well, in consequence, I have been involved with some of them and been to some of the communities in the Green Mountains and in the White Mountains. It is extraordinary to find that in this kind of articulate group who have dropped out, that they also are now concerned. They are far more compatible with an older ethical religious orientation. They may not be actively religious, but they are far more compatible with the ethos of that than they are with this kind of gung-ho contemporary mode of thinking--that the highest morality consists of using the fruits of culture and the authority of the legislature for making a new life for us. In fact, they are not convinced any longer of the compatibility between a social use of learning and legislation, and individual accomplishment.

There is a real deep breach, but that is a breach that was celebrated. That is the way learned people thought for twenty centuries. It is only in the past century and a half that people have thought that you could have both social development and individual development simultaneously. In ages past, people always thought that individual achievement meant you had to do it, grit your teeth, do it in the presence of social agencies and forces around you. I want to put it more boldly than that even. It is almost as if people have for centuries thought the only way you could have individual accomplishment was by suffering, and not by just self-development, which is kind of the modern ethos. So, I do not know what to make of that. I do not know how to resolve all those questions, but I am just amazed that this enthusiasm grows--and not just among people who are incapable but among people who are capable. In one way it does not surprise me, because it is like a return to tradition for which the last century and a half has just been an exception.

Listening Panelist: Dr. Holmer, I think it is quite apparent in the past few years that the schools have been asked to do more and more that used to be the role of the institutional church, or of the strong family unit. The question I would like to raise with you is what, if any, role does education have in shaping or sustaining morality traits in youth today?

Holmer: Well, that is a complicated business. I mentioned to you the fact that the humanities were once taught altogether differently than they are now. Scientific temper (by scientific, I mean scientific in the following manner, namely meaning something like the Germans would when they talk about Wiesenschaft, or a highly organized way of studying the humanities) is something completely different. There is not much difference between the way people, for example, teach English literature and the way chemistry is taught. They are taught...well, English teachers will also do statistical studies and they do word counts and they do all sorts of things. What has happened, therefore, in our modern learning context, is that the humanistic eduction no longer aims at creating taste. Instead, it produces knowledge in people, so that if a person takes English literature, he has knowledge as a consequence. Hence is the fun of Wiesenschaft--the knowledge, rather than our trying to be content with a person who is tasteful. I think that is partly due to the notion that we could have a single and common pedagogy no matter what the subject matter.

Now if you ask about moral questions, moral--the eliciting of moral stature, the eliciting of a sort of religious composition of the person, these things are also taught that way. That, I think, is producing a kind of querulousness on certain learned people who are doing this now. People are wondering whether that has been right to do it that way. I am not sure of how that is going to go.

At my own university where we are examining that question, I don't know whether it is going to end up in just another curriculum committee or not, but I suspect so. Anyway, the query is a serious one, and Yale thirty years ago had a study (some of you probably know about it) that had a great deal to do with reformulation of a liberal arts curriculum. Yale had a rather magnificent study done which again was an attempt to stem the business of turning all literary and artistic cultivation into just aggrandizement of knowledge--making it just incremental knowledge. But, you see, we have produced generations of academic types, all who think that no matter what you do, all you do is sling knowledge. And you fill empty noggins. You stuff 'em. Whether you do it with English literature or chemistry, you just stuff noggins. Then that harms that whole picture of what the humanities are supposed to do to people. You see, it is much easier to teach, for example, in a modern universtiy "musicology" than it is to teach "music." Then the poor people who sit around and "do" music appreciation...they are always thought by the rest of the crowd to be a bunch of dumb-dumbs who just breathe heavily. And they are not the real people. The real people are the ones who do studies--pile up cognitive debris, so to speak. And we are up against a popular mentality that courses through the university. It is never quite articulated, but it moves that way.

Now, you mentioned about the churches. It is the popular thing to say sociologically among the sociologists, that the American churches bought in on the American way of life. But recently, the aggresive, obvious kind of churchdom has also moved in large numbers to being sort of mildly revolutionary--sort of politely critical. They look as if they are projecting some kind of ideal policy for the world. You get all this kind of talk which certainly has nothing to do with historical tradition. The church is supposed to create community and so on. I think that is being criticized not in virtue of an orthodoxy, but just simply exogedical competencies on the religious tradition itself, whether the Biblical or the literature surrounding the religion is starting to make people suspicious of that. But popular religion goes on that way...the lack of learning in religion...the suspicion...there is always a gap between those two.

Listening Panelist: I would like for Dr. Evans to expand on the statement he made that vocational educators would have jobs in spite of the decline in secondary school enrollments. How do you account for the fact that accountability of vocational educators is likely to increase, therefore the statement that the teachers need to be concerned about how well you teach all of your students, not just the cream of the crop? The implication is that we are not doing as well as we ought to be doing.

Evans: Well, in spite of the injunction earlier today to be wary about past experience, the best experience that I can draw is the experience in Japan and Germany, where they faced a shortage of young workers which I think is remarkably like what we will be facing. Now in those countries the emphasis on vocational education has gone up sharply. There has been a movement of the labor force activities out to the ministry of labor and into the ministry of education. One of the reasons for it has been employers. Businessmen, industrial leaders, as well as some union leaders have insisted that the schools have much more of an obligation now to provide trained workers, and this is true even if there is a surplus of young workers. And I think this is a perfectly reasonable kind of attitude to have. If you have a shortage of young workers, then you need to make them as productive as they can be. You do this through any means possible, including apprenticeships, subsidization of training in the big establishments where they have enough economy scale to handle this. Also through provision of public vocational schools where you do not have the necessary economies of scale in business of industry. The accountability is there because the employers say, "Look, it used to be when you turned out some graduates, we could pick and choose among them. So if you had some failure, if you had some people you didn't reach, it didn't matter too much, we would just discard them. If you have a shortage of people, all of them count."

Now I have to qualify this a little bit. Japan has a particular problem with handicapped workers that goes back to their morality, but other than that, the emphasis in Germany and in Japan is on bringing everybody up to the point where they are productive. They see vocational education, both in the schools and in the place of work, as being the principle means for doing this. You can no longer afford to have your failures in vocational education. I think we have had some. I know we will always have some. What I am saying is, I think we will have more push to do something about it.

Listening Panelist: Will they really be as interested as you indicate in insisting on things for the handicapped? Will there really be vo-ag programs for them?

Evans: Well, I am saying we will have no other choice. But beyond that, there are some good things about the new morality in spite of what I interpret our previous speaker to have said. It was perfectly all right for Aristotle to forget about the slaves. He didn't need to pay any attention to them. They did not exist. It has been perfectly all right for us to forget about the 400,000 that currently are in Department of Labor-administered sheltered workshops. Four hundred thousand people, in just that one group of workshops--sheltered workshops. It has been all right for us to forget about those people. Now I think it is part of the new morality, and a fairly desirable part--though, goodness, don't ask me to debate this since I can't cope with him (Holmer)! (Laughter) I think it is a desirable part of this to say these people cannot be shunted aside--relegated, forgotten by an intelligentsia that is concerned primarily about itself.

Listening Panelist: Dr. Evans, in the short run, do you recommend a Youth Corps like Dr. Havighurst mentioned?

Evans: Yes, I do indeed. And it is well underway in a number of communities. We are going to see greater pressure for it, certainly through 1980. Depending, of course, somewhat on the state of the economy, but there are just too doggone many young people, in spite of the rate at which we have created new jobs...paid jobs. We have to do something for this short-term period.

Listening Panelist: Will this be incentive or voluntary?

Evans: I think it will be voluntary, but the incentives will be there, so in one sense, it is not voluntary. Right now, the public schools in quite a number of places are doing this. As Dr. Havighurst indicated, there are some private schools that are doing first-rate.

Listening Panelist: Is this under the authority of the State Department of Education? It will be very interesting to see how it goes. Federal money goes to the State Youth Authority and the State Department of Education.

Evans: It is going to look remarkably like the CCC, except that I do not think it is going to be managed by the Labor Department.

Listening Panelist: Well, will the area community colleges ever change the rules on this?

Evans: Yes, I think they will. We have already seen this in a number of places under the CETA organization, where the Comprehensive Employment and Training Act turns over money to local planned sponsors and to state agencies controlled by the governor. They, in turn, are sub-contracting with quite a number of community colleges and technical institutes to run training programs of this sort. And we are going to see more of this.

Listening Panelist: Do the taxpayers support teaching of young adult persons in agriculture, Dr. Evans?

Evans: I do not know. This is a crazy thing about our educational system which I have never been able to understand. Secondary schools in particular have been directed by their communities to pay no attention to anybody over twenty-one unless that kind of education pays its own way. I have never been able to understand why this is true. In one sense, society is going to pay for some of this. You can look at the recent book that Willard Wirtz has come out with. I am sorry I do not remember the entire title, but it has "The Boundless Resource" in it. It is a 1975 publication. Willard drew heavily on the European experience, where they felt they had to do something about the education of adults. Willard took this experience and went one step further with it and he has two very interesting proposals in there which I think have a very good chance of being enacted, as we begin to recognize that we have to cope with this fifteen million new people in the age group of twenty-five to thirty-nine. His proposals are very simple. One of them is that anybody who has dropped out of school prior to high school graduation is entitled, as a matter of right, to free public education at any time during his life. In order to make that achievable, there would be an income supplement paid for out of unemployment insurance funds, because it takes people off unemployment. So if you dropped out at the end of your sophomore year in high school, you are entitled to two years of post-secondary education or even secondary education at some time later in your life. In addition to this, the second proposal is that everybody has one year of education coming at some year in life--the time to be chosen by this individual. Essentially, it is a voucher system that says an adult can go back to any kind of educational situation, and the design is to use this in getting a person over unemployment in particular and to prepare people for changes in careers.

Listening Panelist: Is this free education similar to the open university?

Evans: Oh, the open university? Well, no, it is not. The community colleges and universities in the city of New York have had free tuition, but that is very different from saying to an adult, "We'll let you go back to school with seventy-five percent of your income paid for a year, in addition to having free tuition." This is very different. I do not know whether seventy-five percent will hold up. That is a pretty stiff subsidy, particularly if it is somebody who has been earning thirty thousand dollars a year.

Listening Panelist: A source of the income would be unemployment tax?

Evans: That is correct. On the grounds that it would reduce unemployment payments.

Listening Panelist: There would have to be a ceiling on that.

Evans: Well, almost certainly there will be a ceiling on it.

Listening Panelist: Dr. Holmer, in your presentation I did not hear the word "relevant" or "instant gratification." These are two terms that I assumed would be in the vocabulary of the new morality. Is this an oversight, or am I...?

Holmer: An oversight, yes, but not one I want to remedy! (Laughter)

Listening Panelist: Dr. Holmer, I have a feeling that both husband and wife working does something to the old and maybe the new moralities of the entire family. Do you have any feelings on that?

Holmer: How is that?

Listening Panelist: I know it changes the life style of the entire family. Are we going to run into some problems eventually with this type of arrangement? Are we already running into problems with this type of arrangement?

Holmer: Well, a range of things seems pertinent here. First, let me remark in response to what Mr. Evans was saying. Say one is opposed to what the New Morality accomplishes. I would have thought that intellectually it would have made more sense to call the issues of contemporary life that I raised, instead of raising them in this moral ethos with all this pathos around it. Even, for example, all this criticism of the Viet Nam war always being made in moral terms struck me as being sometimes morally irresponsible. That does not mean that I was suggesting it was wrong to be against enough legislating on the morality of that or the rightness or wrongness of that. I would say that on a lot of issues we can decide (and I hope we decide them) on behalf of the 400,000 that you mentioned. The fact that to assume easily that this is to acquire moral stature by sort of voting right, strikes me as being a cheapening of the whole picture of morality as well as cheapening the whole picture of what it is to be religiously responsible.

Now, whether or not contemporary family life cheapens that too, by the home not providing the context in which such considerations might ever be moot--that might be, I do not know. The old moral tradition--it does not make much difference any more who you talk about, you take great figures like John Stewart Mill in the nineteenth century who was kind of the hero of liberal Democratic tradition or Emanuel Kant in the eighteenth century, all down through the ages, I think people thought that becoming morally sensitive took years of your life and that you would never get that way by anything short of the anguish of conscience and a self-examination. I do not think also that meant that you were just going to be indulgent. It just meant that if you were going to become a moral person, it required a process of self-perfection that would never end once you saw that. Now whether a modern home allows that or even suggests it, I just do not know. It seems to me that it depends on so many subtle factors. The capacities of human persons to concern themselves in that direction, without the application as Wordsworth said, "a gross and violent stimulus," is rather remarkable, too. Parents sometimes are like the stars; they can shine but they cannot command. And people are just wonderful. They are really individual. They are not predictable and they are not conditionable and that is why there is such an adventure in being a person. I suppose moral culture just keeps that adventuresomeness apparent and gives it a literary context.

Listening Panelist: Dr. Evans, I am not sure I heard and I wanted to have you clarify about career education. I thought I heard you say, the more we participate in career education, the more we will create shortages of an occupation. Did you say that or did I hear it wrong? If you said it, would you amplify it a little bit?

Evans: Well, I do not think I said exactly that. But I was talking about what some labor economists have begun to call the "cobweb effect." This says that as we create information about shortages or surpluses in the current and in the projected labor market we will draw in as part of the cobweb a number of related jobs in which there may not be any shortages and surpluses, and that as we persuade people (as we are more and more effective in persuading people) they ought to avoid fields in which there are surpluses, we will create shortages in those very same fields. As we persuade people that they should go into areas in which there are shortages, then we will create surpluses in those groups of occupations. So it is this aspect of career education that bothers me. We simply do not have the mechanisms for predicting labor market shortages and surpluses beyond very few months with any accuracy. But we do have a mechanism for creating shortages and surpluses through providing information to people on the basis that this is fact. But we create them in the opposite direction than we are predicting them. Is that clear?

Listening Panelist: That then is still our decision--the kind of information you spoke of in agriculture as far as job market is concerned?

Evans: In every blessed occupation going. A friend of mine at the University of Illinois (well, formerly from the University of Illinois--I wish he were still there) has done a beautiful job of predicting what the effects will be on employment in each of a variety of industries. Now he is working on each of a variety of occupations by changes in government policy. If the government makes a decision that it is going to invest heavily in health, how will this affect a wide range of occupations? Well, it will send some down in employment, it will send some up. He has done a good job of predicting what the effect of that government policy will be. But who in the world can predict what government policy will be? We have a lot of retrospective information on this. The Labor Department is as skillful as anybody in the world at predicting shortages and surpluses, trends in occupations. They publish this information, hence it can be checked to see whether or not those predictions in the past have been accurate. Predictions have been little better than chance. What I am saying is, if those predictions are little better than chance, and if we persuade people that those predictions are accurate, then we will turn it around so that they will be negatively correlated with what will actually happen.

Listening Panelist: Dr. Holmer, I would like to narrow it down to my situation here. I am a teacher educator here at Iowa State University and I work with young teachers who are going to go out into the field and teach. What morals and values should I be stressing with those teachers in preparing them to go out and work with young people?

Holmer: Well, I would think that one cannot avoid the fact that all kinds of people are now catapulted by their professions (whether it is teaching or this, that, and the other thing) into situations in which they have to be responsible for decisions. And sensitizing to the moral-like components that surround us and the moral potential of these decisions is part of the effect of the New Morality that certainly is commendable. Now we suffer under that, because it produces a little disorder in our planning, discussing, and so on; because it means so many people now want to discuss everything. But secondly, I think that would be taken very seriously that there is that component. But to do all that at the expense of a tradition that is as noble as the Ten Commandments and as long-standing as the works of Aristotle and Plato...you see, there is nothing cultural. You mentioned slavery of Aristotle, but Aristotle's ethics is not vitiated by the fact that our public policy regarding slavery is now different than it was. What often happens is a kind of "chronological snobbery" grows up in matters of morals, as if the old morals is passé--

just the way, supposedly, an old scientific hypothesis is passé. But that is not the case. Morality does not change the way a hypothesis does. Therefore, when human beings who are going to be in positions of discussing and talking on issues that do involve policies, it strikes me that we have no better assurance that their decisions will be right as against wrong than the creation in them of moral capacities. That is, all the moral decisions as to which policy is right. You end up in a hassle. You still have to trust people, and people have to be trustworthy. The way people become trustworthy is by being made moral--people with character. And that is not just a question of being old-fashioned, that is just a question of being sensible. I find it is reprehensible we are so victimized by argot and half-digested notions as if, for example, every moral view was simply a cultural by-product. There is just a silly relativity of morals as if morals were simply a matter of self-assertion and notions like that. There is very little substance to that. However, popular views are sustained. They float through our society in an almost totally uncriticized fashion, the consequence being that all these policy decisions look like they are now the high morality and all the other concern about equality etatively distinct and ordered personal life looks as if it is fuddy-duddy. Well, that is wrong.

-- Edited by Richard M. Foster

ECONOMIC TRENDS, ISSUES, AND NEW DIRECTIONS IN AMERICA

Dennis R. Starleaf

There are four topics which I want to just touch on this morning, and I'll let you know in advance what they are. The first one is inflation and the inflation outlook for the next ten to fifteen years in the United States. The second one has to do with unemployment. The third involves what we can look for in the rate of growth of the economy over the next decade and a half or so. And the fourth one has to do with the role of the Federal government in the U.S. economy...not only the Federal government as an absorber of the output of the economy, but also government regulation of private producers.

So to begin with, I want to talk about inflation. I always feel more comfortable if I start by defining inflation, which I will do at the risk of insulting your education. Inflation is a protracted and sizeable increase in the general or overall price level. Stated differently, it is a decline in the real purchasing power of the monetary unit. In the United States, of course, the monetary unit is the U.S. dollar. So when we have inflation the real purchasing power, the command over goods and services, of the U.S. dollar declines.

One measures inflation with price indeces. There are literally hundreds of indeces for the U.S. economy. They differ from one another with respect to the commodities which are covered and also with respect to the weight which is applied to the various commodities included in the index. The most popular price index of the U.S. economy, I think, is the Consumer Price Index. Its full name is Consumer Price Index for Urban Wage and Clerical Workers. It is sometimes called the "cost of living" index, but that is a misnomer. It is not a cost-of-living index, because it does not measure what it costs to live. What it measures is the relative costs of a certain "market basket" of goods and services which tend to be purchased by urban wage and clerical workers. And that market basket, the price index that we are currently using, is based on a market basket which was decided upon many years ago, in the early 1960's.

I have here a chart showing the Consumer Price Index in the United States back to about 1910 or so, on up to early in 1975. I do not want to go into great lengths in describing it, but we have all the items from the Consumer Price Index in the upper panel and in the lower one here we have the food component. The vertical axis there measures the value of this Consumer Price Index at various points in time. But that index is a logarithmic scale, so the slope of the line on each chart shows the rate of increase in the index.

What I want to point out is, first of all, if you will look at the period which encompasses the late '50's to the middle 1960's, the rate of increase in the price index is relatively modest. Indeed, from the period from about 1958 or so until 1964 or 1965, the index went up about one or one and a half percent per year, which is just about the extent to which that index is biased upward. That is, the people who build these indeces will typically argue that if you had no real inflation in the United States, the Consumer Price Index would still go up by one to one and a half percent per year, in large part because it does not completely capture quality changes in the merchandise it covers. But then in the late 1960's the index began to rise more rapidly and then in recent years it has risen even more rapidly.

One could not only talk about the Consumer Price Index, he could talk about the Wholesale Price Index, which is another popular index of the general price level in the United States. I will give you a quick glance at that. Again you see that in the late 1950's and the early- to mid-1960's, the overall Wholesale Price Index was practically stable. Then it began to rise in the late 1960's and even more rapidly in the 1970's.

Of course, there have been other periods of inflation in the United States. These are typically associated with war time. For example, you see the rather rapid increase in the Wholesale Price Index during both WWII and the immediate period following WWII. Indeed, the nice thing about the Wholesale Price Index is you can run this thing way back in time. Let me give you a quick glance at the Wholesale Price Index way back to 1800, almost to the inception of the Republic. You will notice that there are lots of peaks here, lots of rapid increases in price level, and almost every one of those cases corresponds to a war. Here of course, is the Civil War, there is WWI, the War of 1812 is in there, and the War with Mexico and so on. And after wars, typically, you find the price level going back down. For example, there was a terrific rate of deflation in the United States from the end of the Civil War until about 1900. This followed WWII as well. What is really different about WWII was that, immediately afterward, we had the period of greatest price stability in the United States that we have ever had. The price level did not fall after WWII which was the customary situation in the United States.

Now, just a few words about who gains from inflation and who loses. Contrary to popular belief, not everyone loses from inflation. Typically, what happens during an inflation is that real income is redistributed. It is redistributed from those whose incomes are fixed in dollar terms to those whose incomes are variable. Think of the output of the economy as a big pie and that one section of that pie has been going to people whose incomes are fixed in terms of dollars. When you have inflation, the real value of the dollar goes down, leaving more of the pie left over for people who have variable incomes.

Inflation also tends to redistribute real wealth. That is, it tends to redistribute real wealth from people who are net creditors to people who are net debtors. For example, let us suppose that I borrow a hundred dollars at six percent interest to be repaid in one year. So I borrow a hundred dollars today and I am going to repay a hundred and six dollars (that is, the principle plus interest) one year from now. Suppose that a year from now, the rate of inflation is ten percent. At the end of the year I repay my loan (a hundred and six dollars) but it is really only ninety-six dollars in terms of the purchasing power of the dollars that I borrowed. I, in that case, am the debtor. I have borrowed money. When I go to repay it, I pay it with dollars that are worth less than the dollars I borrowed. So I tend to gain and the lender tends to lose. Similarly, in a more down-to-earth example, if you have a mortgage on your home, with eight percent interest or six percent interest, inflation is helping you, because every year you are paying your mortgage loan with dollars that are worth less in real purchasing power than the dollars which you borrowed.

Now, let's talk a little bit about the causes of inflation. There are special events which can affect the rate of inflation over relatively short periods of time, but the fundamental cause is excessively stimulating monetary policies. What do we mean by monetary policies? Well, by monetary policies we mean control over the money stock. The board of governors of the Federal Reserve System controls the rate of increase in the money supply in the United States. Incidentally, I was not a governor of the Federal Reserve Board, as indicated in my introduction, but I was a visiting professor with them for one year. If they make the money supply grow too rapidly, you tend to get inflation. Fiscal policy refers to the taxation and the expenditures of the federal government. A stimulating fiscal policy, rather simply put, is a big increase in government expenditures, relative to tax receipts--vice-versa for a depressing monetary policy.

Let us talk a little bit about recent inflation in the United States. Again, I will go back to my original diagram. During the period from roughly 1958 to 1964, as I mentioned, we had essentially the absence of inflation in the United States. Then in the late 1960's, inflation began to rise. We began to move into a period of inflation which continued to increase almost without stopping throughout the 1960's. Why? Well, the root cause was an excessively stimulating monetary and fiscal policy which came about in conjunction with the rapid buildup of the Viet Nam war. By 1965, the U.S. economy was pretty much operating at capacity. Now capacity is a difficult concept. It is easy to talk about capacity, but it is best seen by looking out the sides of one's eyes rather than directly. Looking at it directly tends to be elusive. But nevertheless, it makes sense to say that the U.S. economy was operating pretty close to capacity in about 1965. Then you had this huge increase in government expenditures, in the form of government purchases of goods and services in connection with the Viet Nam war. This tended to add to aggregate demands and to make the total demand for goods and services in the U.S. economy grow more rapidly than our capacity to produce goods and services. The inevitable result was inflation.

It would not have had to have been inflation. What could have accompanied that big increase in government purchases would have been an increase in tax rates, which would have taken aggregate demand essentially away from the private economy and reallocated it towards the federal government. What actually happened was that we had this big increase in government expenditures without the accompanying increase in net tax receipts. At the same time, the Federal Reserve began increasing the money supply at a relatively rapid rate. Let me give you a clearer idea of this. The most common definition of the U.S. money supply is the "total amount of currency in demand deposits in the hands of the public." This is a chart showing the money supply back to about 1910. During the period from the late 1940's to the mid-1960's, the rate of increase in the U.S. money stock was relatively gradual. That was a key reason we had a low rate of inflation during that period. Then in the late '60's and the early '70's, the rate of increase in the money supply was much more rapid, caused, again, by an excessively stimulating monetary and fiscal policy.

So the period of inflation that we have experienced over the past ten years began essentially with the build-up of the Viet Nam war. When Nixon came into office in 1969, it was clear that the U.S. economy already had an inflation problem. So his policy solution to the problem was to try to bring about a less stimulating monetary and fiscal policy. That policy inevitably resulted in the 1969-1970 recession. However, this did tend to slow down the rate of inflation in the United States. Once you build up inflationary momentum, and you get that momentum rolling, it does not come to an immediate stop when you pull off the underlying cause. It coasts on. And this is what we had during the 1969-1970 recession and then off into 1971 as well.

By mid-1971, the rate of recession was coming down in the United States, but it was not coming down fast enough for the administration, which was looking down the road a year or so toward the next election. So we had the wage and price freeze in August of 1971. As you know, this was followed by a series of softer wage and price controls over the next year or so. What was very troublesome during this period, particularly with the benefit of hindsight, was that the wage and price controls masked the inflationary forces within the economy. Both monetary and fiscal policy became very stimulating in 1972. It was clear when the controls came off, like in 1973, that there would be some catch-up in the rate of inflation and there would be a quick increase in price levels.

It was not just because of the relaxation in the wage and price controls, but it was also due to bad crops throughout the world in 1972 and 1973. The Russian wheat deal was one aspect of these bad crops. So in 1973 we had a virtual explosion in farm prices.

Let me give you a quick glance at that on this chart. Here is a little better blow-up of the price indeces in the past few years. This one happens to be the Wholesale Price Index. You can see a huge increase in farm products and in processed foods and feeds during 1973. In contrast to that, industrial commodities made that quick upward jump in early 1973 and then "flattened out." Most economists were expecting that the rate of inflation would decline in 1974 and, boy, were they surprised!

The first major reason for their surprise was the formation of the OPEC cartel in late 1973 and early 1974. Not that the OPEC organization had not existed before, but it had never really operated as a monopoly previous to that. In large part, the force that triggered it was the Arab-Israeli War in late 1973. This pulled the OPEC countries together and got them operating as a thorough monopoly.

As a result, of course, we had a quadrupling of the price of oil over a very short period of time. That had an enormous impact on the U.S. economy. When you increase the price of oil, what you get is an increase in the price indeces of 1974. In a crude sense, roughly fifty percent was due to the formation of the OPEC oil cartel, but it had a much more pronounced effect on the economy than that.

What it did was to alter what had previously been desirable mix of inputs in the production of goods and services in the U.S. All of a sudden a major energy source was more expensive, relative to other inputs, than it had been before. And it not only then caused a rapid increase in the price level, but it also triggered a recession at the same time--a situation which is not very common. We had the recession, a decline in real output in the United States, in the fourth quarter of 1973, when the oil embargo began to have its teeth. This decline in output continued, until the first quarter of 1975, the longest period of decline in real output in the U.S. economy since the end of WWII...a very, very severe situation.

In the last year or so, it is clear that the rate of inflation has been declining and that shows up very pronouncedly in the behavior of the Wholesale Price Index. Less clearly, but nevertheless there, is its effect on the Consumer Price Index.

Now the outlook for the near future...there are lots of people who tend to look at the behavior of the price indeces in the United States over the last couple of years, and to project similar conditions with very little modification, over the next decade. I think that is a real mistake. If I had to bet, it would be that the rate of inflation in the United States is going to be in the neighborhood of two or three percent, on the average, over the next decade or decade and a half. The major hedge on that bet is that we do not become involved in a major military conflict. If we become involved in a major military conflict, fiscal and monetary policy are going to become excessively stimulating and we are going to get a rapid rate of inflation. If this does not happen, it seems to me there is every indication that monetary authorities are going to act in a more responsible fashion than they have in the recent decade or so. And if fiscal policy remains only moderately stimulating, then I see no reason to expect the average rate of inflation to be higher than three percent or so over the next 10 to 15 years.

Well, let me switch over for a bit to talking about unemployment. Again, let us first talk about the definition. What do we mean when we are talking about the unemployment rate? Well, what we are talking about is the percent of the labor force which is unemployed. Now, what is the labor force? The labor force is all people who are working plus all those over sixteen years of age who are actively seeking work. So we are talking about the number of people who are actively seeking work divided by the total number working, plus those who are actively seeking work.

Of course, you can get an unemployment rate for selected groups within the economy. For example, yesterday a couple of the speakers referred to the unemployment rate for people between 18 and 21 years of age.

You would never expect to see the unemployment rate at zero in the United States. Why? Because during any period of time, people are going to take some time to find a job. It may be a matter of days or weeks or months. In the meantime, they are unemployed. You also have people who are re-entering the labor force after an absence for one reason or another. If it is a woman, it may be she dropped out of the labor force to raise children. If it is a male--or, indeed, it could be a woman, too--they may have dropped out of the labor force because of illness, bad health or something like that. They are counted as unemployed as they try to get back in the labor force, because it takes them a while to find a job.

Then, too, in a dynamic economy like that of the United States, you get relatively rapid rates of growth in some industries and some business firms, while other companies and firms are dying. Dying firms are laying off workers, and it takes them a while to re-locate in the growing industries.

You get people who quit jobs for one reason or another. Sometimes they want to move across the country. In the fifties and sixties there was a regular migration from the Midwest to the West coast. People would quit their jobs in Chicago or in Des Moines and would move to the Los Angeles area. When they got to Los Angeles, they did not immediately find a job. In the meantime, they were counted as unemployed.

What we would really like to see is data, not only on the number of people who are looking for jobs, but the number of job vacancies. It would be nice if we could compare those two figures, because at the present time when the unemployment rate is well over seven percent in the United States, there are a lot of job vacancies. We do not have good data on job vacancies, partly because the notion of the job vacancy is again one of those that if you look at it directly it tends to be a little elusive.

It would be very nice if we had such data, because you see, if you discovered that at a particular period of time the number of unemployed people was just about the same as the number of job vacancies, then you would not want to use monetary and fiscal policy to try to get the unemployment rate down. What you would want to do would be to use more micro, or direct, measures to try to get the jobs and people together. Now at the present time I suspect that there are more unemployed people than there are job vacancies.

Many years ago, economists used the rule of thumb that when the unemployment rate was four percent, that there were about as many people looking for jobs as there are job vacancies. I suspect that that may no longer be the case. I suspect that that figure may be more in the neighborhood of five or five and a half percent. Indeed, maybe it never was as low as four percent, because in that period of very great price stability in the United States--from 1958 to 1964, the unemployment rate averaged 5.8%, which is a lot higher than four percent.

As many people mentioned yesterday, the number of young people who make up the labor force is now larger than it was a few years ago. Now young people tend to be people who move from job to job more readily than the older ones. Indeed, the typical member of the labor force in the United States keeps a job for only two or three years--that is, roughly one-third to fifty percent of the people in the United States change jobs every year. Now, in a way, that figure could be somewhat misleading because that also includes skilled laborers like carpenters who switch from one contractor to another. But it gives you some indication, nevertheless, of the enormous rate of job turnover.

There's a tendency for the public when they hear unemployment figures to think, "My God, that's those same people that were unemployed ten years ago--or at least last year." But that is not likely to be the case. There is a big turnover among those unemployed. People go into unemployment and they drop out of it when they find a job.

It seems to me that it is very unlikely that the unemployment rate is going to be any less than five percent for the next decade or decade and a half. The reason I say that is that it seems with the current makeup of the labor force and the way the labor force is going to be for the next ten to fifteen years, lots of young people will be looking for different experiences. It is very natural for a young person not to want to take the first job he gets with the idea of taking it for life. They want to get different experiences. They want to find out what other jobs are like, so they tend to move from job to job relatively quickly, particularly if they do not have family responsibilities. My guess is that if we have a policy program of using our monetary and fiscal tools to get the unemployment rate below five percent for any appreciable time in the next fifteen years, we are going to have an unacceptably high rate of inflation in the United States. So if monetary and fiscal policy has a commitment, which I think is going to be the case, to trying to hold the rate of inflation in the neighborhood of two or three percent, then I think you are going to see the unemployment rate averaging 5.5% for the next fifteen years.

Now, let me switch a bit to talking about economic growth. What are we talking about when we are talking about growth? We are talking about the growth and the capacity of the economy to produce goods and services. Normally the capacity of the U.S. economy to produce goods and services goes up year by year. Why? Well, because we have growth in the labor force. The labor force grows not only in numbers but it also grows in quality. In addition to that you get growth in the capital stock. What do we mean by capital goods? We mean machinery and structures which are useful to produce other goods and services. Capital stock typically goes up year by year. Then you get increases in the availability of natural resources. It may seem a little surprising, but it nevertheless is true. Year after year the amount of available natural resources that goes into the production of goods and services in the U.S. goes up. It has been going up for a period of time. Many people feel it will not go up in the future, at least as rapidly as it has in the past. And then, finally, you have technological change.

For all these reasons, the capacity of the economy tends to rise, Historically, the capacity of the U.S. economy has gone up somewhere in the neighborhood of three to four percent a year, all the way back to the 1890's or so. That is not terribly rapid compared with some other countries, but it is pretty impressive over the long haul because it means that our ability to produce goods and services doubles every sixteen to eighteen years.

I do not think that the capacity of the U.S. economy to produce goods and services will grow as rapidly over the next decade or decade and a half as it has in the past. I do not believe it will because, first of all, the labor force is not going to be growing quite as rapidly, but more important than that--and it seems to me a good argument for us--is that natural resources, and particularly energy, will not be as readily available over the next 10 to 15 years as they have been in the not-too-distant past. For those reasons, I think the rate of growth of the capacity of this economy to produce goods and services will be less. I would guess in the neighborhood of 2.5% per year would be the predicted growth in capacity.

Now, let us switch a bit, and talk about the role of federal government in the U.S. economy. I passed out a set of tables in which the first table shows the gross national product of the United States economy for a number of selected years measured in 1972 prices. What is gross national product? It is a measure of the total output of goods and services of the U.S. economy over some span of time--in this case, over the span of a year. So, if you measure this output of goods and services in 1972 prices, as shown here with this table, in 1955 we produced almost $655 billion worth of goods and services. By the middle 1970's our total output had come close to doubling what we had back in 1955. Now there are a couple of things I think are of interest here. First, this table gives you some idea of the severity of the recession which we have just left, when you see the decline of the gross national product from 1973 to 1975 was about four percent--really quite large. But I am not really so interested in that as I am in talking about the role of the federal government. If you will look over on the right hand side of your table under "Government Purchases" you will notice that federal government purchases are down in real terms to about where they were in the early 1960's. There has been a tremendous pullback in the amount of goods and services absorbed by the federal government, as well as the amount of our current production absorbed by the federal government. Of course, state and local government purchases have been rising.

You get this same impression if you look at Table 2, which shows the percentage of major components in the total gross national product. Notice that federal government purchases are now in the neighborhood of eight percent of our total output. This is the smallest amount they have been since the end of WWII. There has been a tremendous pullback in government purchases. If you look under federal government purchases in the late 1950's, it was absorbing more than thirteen percent of the total output of the U.S. economy. As late as the mid- to late-1960's, it was in the neighborhoold of twelve percent or so. In contrast to that, government purchasing is down to about eight percent now.

I am sure this must seem surprising, because we always hear all this talk about the increase in governmental expenditures. You see, expenditures includes purchases, but it also includes a lot of items you might call transfer items. Welfare payments are transfer items. When the federal government sends a Social Security check to someone, the federal government is not buying anything, it is not absorbing any output from the economy. It is simply transferring tax receipts to the private economy. Essentially, it is returning command over goods and services to the private economy.

Table 3 gives you an indication of the difference between federal government purchases and total expenditures. Now this is in current dollars for the year 1974, not 1972 prices. All these items here under "purchases" are really transfer payments. They are payments by the federal government, in some cases, to the state and local governments, but for the most part, back to the private economy. It is returning to the private economy command over goods and services, rather than the government absorbing it. What has happened is that the amount of transfer payments have risen in the past few years. At the same time, government purchases have been going down relative to our total output, so the total federal government expenditures are now in the neighborhoold of 23% of the gross national product.

My point with this table is simple. The federal government is playing a much more important role than it has in the past in influencing the distribution of private incomes in the United States. So, essentially what the federal government is doing is taxing away from some people in the United States and returning the money to the private economy or transferring it to others to affect the distribution of income. This has been the big increase in government activity from an expenditure point of view. It is not that the federal government takes command over more goods and services. Quite to the contrary, it is simply changing the distribution of private incomes. I doubt if the level of federal government influence upon the distribution of incomes in the United States is going to go up. More and more people are going to have their incomes significantly influenced by the transfer payments from the federal government. Some sort of a national health program would be another example.

Now let us talk a little bit about direct federal government impact on regulation of private business in the United States. The Ford administration has been talking about trying to relax the amount of federal government control over private business in the United States. And particularly trying to get rid of government regulations which now seem very clearly not to have the effect of protecting competition, but rather to protect competitors from competition. For example, much of the federal regulation of the transportation industry is of that type. The federal government essentially puts minimum prices which truckers can charge to haul goods in an effort to hold down the amount of competition among truckers and hold up the price of transportation service. Railroads are heavily regulated, of course, and the Ford administration has come out and asked that this kind of activity be cut back. Airlines are also heavily regulated.

I do not think de-regulation is going to happen, to be honest, because these individual industries have a lot to lose by those federal government regulations being relaxed. The rest of us have got something to gain from it--but the thing is, each of us is going to gain a relatively small amount compared with the loss of the people involved, and they are going to have much more incentive to beat on the doors of their Congressmen and prevent de-regulation.

There have also been proposals which came out of the Nixon administration to increase the amount of competition among commercial banks and savings and loan associations and other financial intermediaries. Some of this is already taking place, but I do not think we are going to have a good deal of this. I just do not believe that Congress is going to let savings and loan associations have all the power that commercial banks now have. The bankers can make a good case to the Congressmen, of course, and the rest of us are unlikely to do that, so I do not think it is likely to happen. I do not look for any big decreases in the amount of government regulation. If anything, it seems to me that it is going to increase in the future.

--Edited by Richard M. Foster

SOCIAL TRENDS, ISSUES, AND NEW DIRECTIONS IN AMERICA AND THE WORLD

Douglas Ensminger

I want to join the previous speakers in expressing my appreciation for the opportunity to be included in this very significant seminar and to congratulate this institution on having organized it. So that you will not think I am fudging on my title here, my instructions in writing were that my topic be "Social Trends, Issues, and New Directions in America and the World," so if I later on begin to deal with some of the topics in relationship to the world, don't assume that I have overstepped my bounds!

At this particular point, you probably are beginning to raise the question "and now what?" I remember when the first of the five Ensminger children was about three years old, she was very active in the period of wanting an answer to all questions--and not taking any single answer at face value. There was one occasion in particular, when she and I were in a period of my trying to answer her questions, and I thought I had given a definitive answer. She look up at me and said, "...Daddy, and then what?" So I suspect you are beginning to wonder, "and then what?"

I am going to make my presentation first in dealing with the question of social values and then move on to institutions in general, then the family as an institution, religious institutions, educational institutions, and the final section on issues having signficance and implied new directions for America and the world. Some of you may have received an earlier draft of my paper. I hope that the later draft will be available because I have made significant changes on the section relating to religion and the church.

Social Values What I am going to do is go through these with not too much elaboration because I have spent a great deal of time trying to bring these down to concise statements that, hopefully, communicate the essence of what I am trying to share with you.

---First, the present generation of young people is less concerned about success measured in economic terms. They are moving toward more humanistic values, expressing concern for others and seeking a simpler way of life.

I would recommend that any of you who have questions on this, or want more insights into it, get the book published in the late 'sixties by John D. Rockefeller III, titled The Second American Revolution. This is a little book, really dedicated to the young people who were going through the period of turmoil in the mid-sixties. He says the young people at that point were in search of new values, and that the revolution is a revolution in search of more humanistic values, while still not giving up all the materialistic values.

---There is a trend toward earlier retirement, shorter hours, and increased emphasis on leisure time. I am going to return to the section of the aged several times later, but right now the trend I want to emphasize is that we are, as a society, giving greater value to leisure. I happened to come out of the Depression period when leisure was a sin, and I have had a great amount of difficulty accepting leisure. But I can tell you, it hasn't worried my five children a bit!

---The U.S. is moving toward more conservative thought. I think we are going to see more of that as the political campaigns proceed. This question of moving toward more conservative thought is going to have great implications on many things so far as the future is concerned. Both leaders and the general public are expressing concern about the dangers of technology and increasingly question whether or not all technology, when applied, will be in the best interest of society. Our speaker yesterday had much to say on that issue.

---Economic pressures will subside, resulting in slower pace and greater value on leisure. (Another indication of increasing values on leisure.)

---The trend toward a class society in the U.S. will continue, especially between the intellectuals and the blue-collar workers. In the past, we have prided ourselves on being free of a class society. But I think the evidence is quite clear, and there will be other things that I will present later on this trend.

---If our traditional value of people based on performance is to prevail, people need to have evidence they will be rewarded on the basis of performance and not because they are members of either an elite group or minority group.

---With respect to the aged, our sense of values is wrong. We move people from full employment to social security with half the income.

---Increasingly, our values and cultural responses to what we believe and will accept are being shaped by the media. I think those of you who are wrestling with the question of education here today, need to take very serious account of this--in terms of the fact that the media is performing many of the functions with respect to our responses to cultural values and that education is not playing the role that it did in the past.

---The moral fiber of America continues to degenerate, indicating institutional and individual weaknesses.

---An important value issue facing America is that of free choice versus social control. We would like to believe that we are going to have increasing opportunities for free choice, but I think that is going to change. One example of this is the energy crisis where more and more decisions will be made without our having an opportunity to participate.

---The large corporations having control over massive wealth lack social concern and are motivated almost exclusively by monetary values. I think this is a very great concern in terms of American society.

---Attitudes of discouragement, disenchantment, and lack of trust in America are widespread. There is a general need for respect of property and the rights of others. Since having prepared this paper, the Ensminger's house has been burglarized. So I am a little more sensitive to the fact that we no longer have the privacy that we once thought we had.

Institutions in General

---Institutions in general are self-centered, self-serving and lack the capacity for individuals to participate in change. I think this is a very significant trend.

---Institutions lack the capacity to take a long term look. Their interest is here and now in the preservation of their present status. I think this institution, Iowa State University, and what is going on here today, is a noticeable exception, and I would emphasize--it is an exception.

---Whereas in the 'sixties young people rebelled against institutions and establishments, they are today working for change within the institutional establishments and structures.

---Distrust for bigness, be it government, corporation, institutions, universities or area-wide higher education systems, is widespread throughout the United States.

---Institutions today do not envision positive roles for women. Ask a woman--they will tell you so.

---Institutions provide no meaningful way for people in retirement to express themselves up to the time of their death.

---And finally, none of the institutions today knows how to deal with the question of death.

The Family as an Institution

---World pressures for a more equitable sharing of the world's resources and the increasing cost of energy will compel families to accept a less materialistic and lower level of living. The emphasis here is that the pressure will be to enforce the changes and that they are not likely to take place in a very signficant way on a voluntary basis, but this is going to take place.

---Morals will continue to be defined by society out of crisis, with less emphasis on the institution of marriage for sanctioning sex relations.

---The family as an institution will be under increasing stress as men and women seek equal status and roles. This will be most pronounced in professionally oriented men and women. I had a long talk with a Dean of a medical school and he says that so far as the medical profession is concerned, he sees both husbands and wives in the medical field as a great source of stress in the family.

---Following an increased sharing of controls within the family and as the roles of women become more dominant, the family will be under increasing pressure to meet the emotional needs of the members of the family.

---While the family as a value-oriented institution has been drifting, it is still the basic institution concerned with instilling and preserving values.

---In the traditional American family, women played the key role in transmitting values. With women now seeking competing roles with men, value responsibility within the family will increasingly be shared by both the men and the women.

Educational Institutions

---Higher education is losing its power base. All public institutions know that. One of the things that is happening is that the political leaders and the taxpayers today are very vague in terms of what is the mission of an institution of higher learning.

---Higher education will, in the future, give higher priority to minorities and the aged.

---As financial pressures heighten, public-supported higher education will shift from present emphasis on accessibility and a right to all students, to discrimination in terms of those who can meet entrance requirements and profit from higher education. I think this has tremendous implications and I know in institution after institution, they say they do not like to face this, but they feel they have no choice. This will not only adversely affect the upward climb of the economic and social ladder, but it will also add to the trend of the U.S. becoming an increasingly class society.

---In higher education, the need will intensify to prepare students intellectually and for them to apply their intellect in economic, social, cultural, and political pursuits. I think this has tremendous implications for the question you are searching for right now--in terms of vocational education and preparing people to meet life situations and find their way through the problems. Because of the complexities of the problems ahead, there will be greater need for broad-based liberal arts education in contrast to narrow vocational and technical education. The danger is that education is being equated with jobs rather than with helping students find a larger measure of self-fulfillment.

---When thinking about education for women students, it will be wise to visualize those who seek equality of roles with men likely moving through two, three, or more employment paths, or career paths.

---In the U.S., institutions of higher learning, could if they had national policies in support, contribute significantly to reducing the unemployment by lengthening the time spent in a university. The alternative could be public works programs.

---The universities lack the built-in institutional mechanisms to think differently about the future than they did in the past; therefore, they continue to perceive their roles in the future as being a continuation of the past. And, again, I think this institution and this seminar is an exception.

---Higher education will be less rigid in defining its role to serve a narrow age group and will offer more non-traditional programs for adults and the aged.

---And finally, I think the U.S. appears to be drifting at sea, lacking goals and priorities for education.

Religious Institutions

---Religion and the church, as an institution, are here to stay.

---Since the churches have historically functioned as being supportive of our American way of life, it logically follows as America becomes more conservative, so will the church. The recent growth in church membership in the U.S. is from the conservative denominations. This is supported by facts.

---The church has lost its dominance in value formation. But faith in educational institutions to take over value formation roles has also declined. There is an increasing trend of adults who are now turning to the church for help in preparing them for parenthood.

---The disenchantment of youth with religion as expressed in the 'sixties, has subsided. According to a Gallup Poll in 1975, nationwide church-going remained at the same level as the four previous years with forty percent of adults attending church or synagogue in a given week. As many young adults 18-29 years old as older people participated in religious activities other than church services during the test week.

---Traditionally, the church's role has been to be supportive of the American way of life and cultural values. This will continue and the church will increasingly seek opportunities to serve as a prophet on social issues and ills. The church will tend to identify the American way of life with the Kingdom of God.

---Campus ministries have fallen on hard times, largely because campus ministers were involved with student uprisings during the 'sixties. The present generation of students sees the campus ministry as spiritually bankrupt.

---The church will play an increasingly unique international role, supported by a minority who will speak out and involve the church in international commitments.

---While the trend in church membership in relation to the total population is likely to continue, there is strong evidence to suggest a trend toward increasing commitment of members to religion and the church, with implications of a more influential role for the church in the future.

Issues Having Significance and Implied New Directions for America and the World

---Given the western outlook, which is inward and void of understanding of the long history of our development as a major industrial nation, the people in the U.S. have little understanding of the interdependence of U.S. industrialization, agricultural development and America's high materialistic level of living with the mineral resources of the world.

---Here is one very significant one for you in the field of education--American agricultural institutions are very self-centered and not tuned to world issues. American agriculture lacks a unified and effective power base to participate in formulating national agricultural policies with world issues.

---Needed in America is a broadening and deepening of understanding of the role world trade can have in improving the economy of the Developing Countries, and the interdependence of the state of the U.S.'s economy and that of the Developing Countries throughout the world.

---Whereas in the past the U.S. has been a high consuming society, in the future, we will need to move more toward saving, both in monetary and in materialistic elements of living. We will move away from being a "throw-away" society to a recycling society.

---Whereas today the people in the U.S. tend to assume science and technology can solve all problems, in the future we will come to understand that the problems of both the U.S. and the world will become increasingly complex and we will be a mixture of social, economic and political forces.

---A major social issue of the future is to initiate a change in the role of technology. Our present orientation is that man serves technology, while what is needed is for technology to serve man.

---Because of the growing complexities of the problems, major decisions facing institutions and government will be management decisions. Individuals will have fewer and fewer options for free choices.

---The big issue will be how to become accustomed to making complex decisions in a changing world which will increasingly be influenced by social, economic, and political variables.

---The American public is generally indifferent to both national and international issues. People's basic concern today is for self, not for humanity.

---The unwillingness of economic classes, both within the U.S. and the world, to work together, to improve the quality of life for all seems likely to persist in the future.

---On the world scene, the risk will be ever present to resolve the world problems through the explosion of the atomic bombs. Restraint, compromise, and sharing of resources must, through the U.N., be pressed as alternatives to the Bomb.

---The media, which places emphasis on "sensationalism" as headline stories, is contributing to the public's inadequate understanding of complex issues and problems.

---The growth in wealth and political power of large corporations has contributed to the increasing movement toward a controlled society.

---As the U.S. moves toward zero population growth, we can anticipate far-reaching institutional, as well as economic, social, and political implications.

---It would seem inevitable that socialization will continue both within the U.S. and the world, and that government will be looked to for providing more, not fewer, services.

---Through the application of intermediate technology, and labor intensity, we will see more families improving their quality of life on smaller acreages than we now think of as being possible.

---A population trend having far-reaching implications is the marked growth in the number of older persons and the declining birth rate. On the basis of current estimates of length of life expectancy and a birth rate that is barely at replacement level, the median age of the population is expected to increase by six years to 34.8 over the next decade. The population aged 75 and over will grow 2½ times faster than the rate of the population as a whole. By 1990, the dependency ratio of the number of workers per retired person will drop from 4.6 to 3.5. The shift in age structure almost certainly will require reexamination of retirement age policies.

---In general, social programs both in the U.S. and the Developing Countries are today evaluated on the basis of economic viability. Many needed social programs should be accepted as requiring subsidies, simply for the contribution they make to improving the quality of life.

---The trend toward concentration of population in urban areas and the fringe areas of metropolitan cities will continue both in the U.S. and throughout the world. The crisis of the cities is likely to continue until the political and ecological boundaries become coterminous.

---Women are one of each nation's best and under-used resources. Because of the cultural influences that have placed women in their traditional roles, it will take a long time for society to accept competing roles with men and for women to achieve significant new opportunities for productive roles.

---Race relations in the U.S. will continue to improve. Economic opportunity, more than any other single factor, will contribute to the improvement of race relations. Our objective must be to work toward an increasingly open society.

---Alcoholism is a major social problem in America. There is a growing acceptance of drinking at all age levels.

---The continued use and abuse of drugs for both young people and adults is an intense social problem in the U.S.

---America's early and persistent commitment to work ethics is changing in that increasing value is being placed on work being self-satisfying and in there being an increasing quest for leisure. But work continues to be a high value in America in getting ahead.

---Throughout American history, many traditionalisms have given way to national programs and later resurfaced to assert themselves. One such traditionalism which is again asserting itself is "return to the people" the right and the responsibility to manage programs which directly impinge on their daily lives.

---A worldwide issue, prevalent in America, is the complex contradiction in values related to the abundance and persistence of poverty.

---Since few significant social changes come about only through crisis, violence will continue to be an integral part of the process of black-white, minority accommodations and integration of schools and housing.

---Pressures will mount in both the U.S. and throughout the world to support equality of opportunity and higher quality of life for all.

---The U.S. faces a period of conflicting social desires, lower expectations, and economic domination by those who control mass wealth.

---There is today at all levels of government--national, state, and local--an imbalance between what the people expect of their government and what the people can and will pay for the demanded services.

---For the Developing Countries, as well as America, inflation adds to the burden of the poor and increases the percentage of people who live in poverty. This process will breed discontent and lead to political turmoil and violence.

---We have heard a lot about energy, but water is likely to be America's major problem for domestic, industrial, and agricultural use. Water can be expected to create major environmental and political issues in the future.

---Given the trend of continued population mobility, there will be a continuous weakness of community identification with neighbors, problems, and issues of the area of residence.

---The U.S. farm population will level off at about 3 to 4 million, but with increased stratification.

---Commercial farmers will be between one and two percent of the U.S. population. The commercial farmer will be without a power base and will be a unique social phenomenon.

---The world's population-food-energy crisis brings to the forefront the low concern we have for people in distress. I would just simply say if I have any one concern about America today, it would be how easy it would be for us to accept mass starvation of people as being normal.

---The U.S. is no different from the Developing Countries when it comes to those who control mass wealth perpetuating class struggle.

---Institutions throughout the U.S. are not adequately involving the people in the formulation of policies for sharing food with the world's needy and for the world's resources to be more equitably shared with the world community.

---On a worldwide basis, we talk of improving the quality of life. But nations are committing more and more of their budgets for arms. The nations that are massing great political profits from the sale of resources are now investing their new wealth in arms and will increasingly exert control over the world.

---Out of frustration about such issues as the growing population, how to feed the world's hungry and the by-passed people, the American people are concluding they can do nothing, and therefore accepting the world's ills with an attitude of indifference.

---The U.S. is now in the post-industrial era, with about one-third of the people employed in the manufacturing industries.

---We are rapidly becoming a service-oriented society. A service-oriented society means more, not less, government intervention. With a service-oriented society there will be more and more confrontation between special interest groups, such as occurred between the labor unions and agriculture over the sale and loading of wheat to Russia.

---On a worldwide basis, we can expect deepening tensions between the "have" and "have-not" nations.

---For the U.S. to be effective in foreign affairs, it is essential that the American people have a sense of participation through their elected representatives in formulation of U.S. foreign policy. Of equal importance will be for the American people to understand the rationale behind foreign policies of the foreign governments throughout the world.

---And, finally, if the world community is to succeed in providing the conditions to improve the quality of life for all the people, the U.S. should join in changing priorities from expenditures for arms to expenditures to eradicate world poverty. World poverty must be accepted as a social disease, and its eradication must be tackled in much the same way the world community joined in wiping out smallpox.

We have never had a more significant opportunity for agriculture to come to the forefront in playing the dominant role for world peace than we have at the moment. If we had the intelligence (and we have it, but do we have the will?) we would begin to think positively about bartering food for disarmament, and using the money saved from armament to eradicate poverty and move to the quest for peace.

Thank you.

--Edited by Richard M. Foster

INTERACTION V: Douglas Ensminger and Dennis Starleaf

Listening Panelist: Dr. Ensminger, I have two questions for you. First of all, do you doubt the value of job experience programs in meeting a child's needs for the future? It sounded somewhat like that when you talked of education being broader-based.

Ensminger: Many of you are going to have to add this on to it, but it seems to me that in the kind of society we are moving into, first and foremost an individual has to have the capacity to understand it, adjust to it, and work within it. And without a broad-based education, you will have great frustrations.

Listening Panelist: One more question, what do you perceive as the role of education in increasing the moral fiber of the nation or of the child, or do you think this is the church's role?

Ensminger: Well, I think that one of the things that education needs to do is to help people to understand what the issues are. I would think on some of these things we are talking about here--the whole question of the world population-food-energy crisis--we need to start at the high school. I had an experience a year ago dealing with a class down at the University of Missouri of about a hundred and sixty-five students in a basic course on environmental studies. This was after the U.N. Population Conference and the U.N. Food Conference. I asked how many could tell me one thing that had come out of the World Population Conference and I got one hand. I asked how many could tell me what came out of the World Food Conference, and I got three hands. Now how can people go out as citizens being so totally uninformed of the world community in which we are now compelled to live? It is no longer debatable whether we are going to join the world community. We are a member of the world community.

Listening Panelist: Dr. Ensminger, you mentioned the practice of finding work that is self-satisfying, yet Dr. Tyler said that people change jobs every two or three years. Apparently we are getting some bad information somewhere.

Ensminger: Well, I think maybe each time they move into a job they do hope that it will be more self-satisfying and rewarding. It is not just "quits". It is also lay-offs and things of that nature. What tends to happen is that people, particularly in their early years, tend to move from job to job more readily. Later on when they get saddled with a family they tend to get locked in on a job.

Listening Panelist: I have a couple of questions for you. What are the best sources of recommending information for the farmers--on farm population, business markets, their own operations, that sort of thing?

Starleaf: On markets? I presume the farm management specialist with the extension service would be the place for a farmer to go. But then, of course, there are all sorts of services which were pointed out yesterday, from the various suppliers of farm products or machinery which would give information--not just technical information, but information on markets. We regularly have outlet conferences here at Iowa State on grain prices.

Listening Panelist: How do jobs provided by the government affect the demand for farm products? I mean make-work jobs as compared to the demand for farm products if it comes on welfare?

Starleaf: I do not think there is really much difference. The income elasticity of the demand for food is not very high. That is, as one's income goes up, the purchase of food goes up as well, but not by the same percentage. I do not think that you are going to notice much difference between the income that people receive from working and the income that people receive from welfare. I think they spend about the same amount on food, regardless. It does not make that much difference.

Listening Panelist: Dr. Ensminger, you made a statement that the commercial farmer will be without a power base. I fail to understand that. I can see that they will be fewer in numbers, however with a greater appreciation in the need for food and fiber, even though the number is fewer. Wouldn't they still have a power base?

Ensminger: My point would be that they are going to have to face this and create a new power base. The Chambers of Commerce can be very effective allies for the American farmer, the League of Women Voters, in terms of the groups that really understand what is involved in our having policies supportive of maximizing production with the farmer having confidence of reasonable profits.

Listening Panelist: Hopefully, we are moving in that direction and get that power base without the numbers.

Ensminger: Right. Talk to the farmers throughout the United States as I have, and they increasingly say, with our numbers going down, we do not have the same voice, the political voice, in Washington, that we used to have. That is what I am talking about.

Listening Panelist: I have a question here for Mr. Ensminger and for Mr. Starleaf. Mr. Ensminger, I heard you say that there is a greater need for broad-based liberal arts education, rather than narrow vocational and technical education. Would you mind reversing the adjectives? Put "broad" on vocational and technical education and "narrow" on liberal arts and then comment on them?

Ensminger: You mean that there is a need for broad-based vocational education...?

Listening Panelist: Rather than narrow-based liberal arts. Would you comment on that?

Ensminger: My point is this: the kind of society, economy and world issues that are ahead of us are more complex and are going to get more complex. If the people moving out with areas of responsibility are going to act intelligently in this, they need an education that develops a mind more than their skills. Now there are large numbers of people who move out where the skills are important. But it seems to me that there is a danger today that jobs are being equated with an education. Now I do not think we are in an "either-or"...I would never want to get into that kind of a predicament.

Listening Panelist: ...so it is the adjectives rather than the nouns? Can I finish my question for Dr. Starleaf now? You told us about fiscal and monetary remunerations which are the professional choice of Mr. Greenspan and his associates...

Starleaf: Yes, monetary policy and even fiscal policy.

Listening Panelist: But they employ these as a ploy which has not worked very well.

Starleaf: I suppose you could say that.

Listening Panelist: Actually, I was hoping you would say something about the Employment Act of '46 which is their authorization to do this. In effect, that Employment Act and their authorization to engage in these things is a policy without equivalence. It really means that they still assume that labor, as Adam Smith assumes, is merely a group of ends--no qualitative dimensions at all. Whereas our employment policies in the Department of Labor and HEW are essentially programs without policies. Do you think it would be a good idea for Mr. Burns and Mr. Matthews in HEW to talk about these amongst each other? Or should they go off in their separate ways--one dealing with program, another with policy, and not connecting it together?

Starleaf: Well, undoubtedly there is some communication and I would not want to come out and say, "No, there should not be any communication." But it seems to me that the micro kinds of policies which are the appropriate things for HEW and for the Labor Department and so on, are really somewhat different than the macro policies. What you are really trying to do with the macro policies is to control aggregate demand, to follow some sort of a track through time. Why do you want to control aggregate demand? Well, you have all these different objectives, and one of the objectives in controlling aggregate demand has to do with the Employment Act of 1946. Usually, if you are writing a text book, and you are going to talk about macro economic policies, you start out with the Employment Act of 1946. But I do not think when the Board of Governors sit around the table and talk about monetary policy, they are thinking about the Employment Act of '46. They are thinking about unemployment in part, but they are thinking about price stability and balance of payments and preservation of the Federal Reserve and all sorts of things like that. What has happened--when you say monetary and fiscal policies have not worked very well, they certainly have brought down aggregate demand very well. It is just that they have not brought about the decline in the rate of inflation as fast as many people thought it would come down. Now that the benefit is hindsight, you can look back and say, "For crying out loud, it took us six or seven years to get it up there. Why do you expect to bring it to an end in a year or so?"

Listening Panelist: Is it true that it brought down aggregate demand?

Starleaf: Well, sure, this is the recession that we have had.

Listening Panelist: You mean energy prices haven't had much to do with that?

Starleaf: Oh, sure, the energy prices have had an effect. But you could have offset the energy crisis by giving the economy a stimulus with monetary and fiscal policy. But you know the money supply had been growing at about eight percent and then the rate of increase in the money stock was cut back to around four percent. You see, that is quite a wrench to the economy. In addition to that, you have had this pullback of federal government purchases. But clearly, monetary and fiscal policy could have been used to offset that impact. I do not mean to imply that I think you can fine-tune the economy with monetary and fiscal policy. I used to think that, but I do not think that any more.

Listening Panelist: I guess I am still confused as to how we are going to cure poverty and make people happier in their jobs if we do not have emphasis on providing them with skills to--I come back to this area again--the dissertation that you had about vocational education versus liberal broad-based arts and sciences...

Ensminger: I want to leave that for Dr. Tyler and see what he says when he comes on! I would just simply say that first and foremost, I think for the people who need to move into certain areas of the labor market, they need to be trained in skills. But if we give up the emphasis on broad-based education in our universities, then we are going to be turning out people who are simply incompetent to deal with the world's issues that they are going to be confronted with.

Listening Panelist: I think someone said, though, that if someone wants to move the world, first of all he has got to move himself. I guess that is the base I am moving from. If they are not going to move themselves, I do not see how they are going to solve the world's problems.

Ensminger: This I recognize you are going to get great debate on. And it is not an either-or situation.

Listening Panelist: I feel that one of the biggest problems we have in the school systems right now is the management of youth. Some of this comes about because of lack of faith. But you commented that the role of the family will be changing, will be less materialistic, the level of living will be changed. Possibly this has inference that there will be fewer cars for youth, I don't know. With the changing family emphasis and so forth, do you think they will have some carry-over as far as the freedom of youth within school systems, and what effect will that have?

Ensminger: Well, I think there is already considerable evidence that parents and the community are having some major second thoughts about all the freedom that they felt the students should have in school and how little control or discipline or direction the teaching or administrative staff should have. This, it seems to me, is changing right now. In our society, I think that we have to recognize that great changes only come out of crisis. And we would like to believe otherwise. Now you take the world scene. I left India deeply believing that before India would politically be able to solve its food problem, or its population problem (you know they are interrelated), it would require a major crisis, maybe of the dimension of several million people dying of starvation before you would have the political muscle to bring about the changes.

Listening Panelist: So you think we are not going to have the looseness within our school system?

Ensminger: I do not think so.

Listening Panelist: Dr. Starleaf, do you think that cheap food will be a national policy?

Starleaf: I am not sure it is a national policy. Clearly, politicians are going to be concerned about the price of food. There is just no doubt about it--just as they are about the price of energy or anything else. Suppose that there is a real bad harvest throughout the world next year and the price of grain starts doubling in the United States. Well, I will just bet you dollars to doughnuts, no matter what President is in there, he is going to control exports. Because he knows damn well that (this is particularly, of course, next year--the election will be behind us) if the election is coming up close he is just going to have to respond. And if he doesn't, the Congress is going to do it. Because the Congress is going to be facing an election down the road.

Listening Panelist: Due to the economics, and I refer to Dudley Bell, when we have peak employment of our capacity or production, any increase in money incomes is going to produce inflation. Isn't it true? At least many economists say it is--that we produce inflation even in periods when you do not have full production and that, therefore, it is no longer profitable to count all inflation as demand inflation.

Starleaf: Okay. This is an argument for cost-push inflation. A very common type argument. It seems to me that there is a major weakness in the argument for cost-push inflation because the argument implies that it is always to the interest of the business firm with monopoly power to raise its price and that is not true. That is not true, because, for example, suppose General Motors was the only seller of automobiles, the only domestic producer. Suppose they raise the price of automobiles to a hundred thousand dollars apiece. They would not sell very many automobiles, and they would not make very much profit. There is a profit-maximizing price and once you have found that profit-maximizing price, then you are maximizing your profit. If you raise the price, your profits go down. Now this is not to say that if the demand you face shifts or that your cost face shifts that you might want to change the price.

Now how about unions? Labor unions possess monopoly power. I do not know what a labor union maximizes, but I know damn well that they do not maximize the wage of their workers, of their employees, or their members, I should say. That is, they do not maximize the hourly wage because if they did they would ask for a hundred thousand dollars an hour. And if they got it they would not have any employment. I know damn well they do not have a firm market. I am not sure they ever did. The percentage of people who belong to labor unions is lower now than it was fifteen years ago. I do not see any evidence that there is more monopoly power in the business community in the United States. I do not think the automobile industry is any more concentrated. Indeed, we have more competition from imports now than we have ever had before.

Listening Panelist: Well, there are many economists who would disagree.

Starleaf: I know there are, and I do not say that there are no cost-push elements involved. But I do not think that you can have a cost-push inflation which is not in some way ratified by monetary and fiscal policy. Now I am not saying that there are not any cost-push things involved here, and it does not take just monopoly power. I mean if you have a rate of inflation of five percent and it goes on year after year at five percent and people begin to expect it, that rate of inflation is reflected in the contracts--the contracts that extend over time. When the underlying cause of inflation is backed off, it is not going to come to an end like that, because it is built into the contract. But I do not see any big structural change in the economy in terms of more monopoly power from what it was ten years ago. I do see a big change in fiscal and monetary policy. It seems to me that that is the most likely explanation for the difference in the performance in the rate of inflation.

Listening Panelist: Dr. Ensminger, I am still a little confused about all this, from the standpoint that our religion is getting more conservative. We have these moralistic problems. What are we going to do with the poverty-stricken and the people who need help? Just where are we going to start? Are we going to back our religion, and try to solve these problems? What do you feel?

Ensminger: Well, I think that one thing I am concerned about, in terms of how you really begin to move this thing, is that the institutions are basically self-centered and self-serving. It is very difficult in this country today to find organizations and institutions that have a concern about humanity in general.

Listening Panelist: You are including the church as an institution, aren't you?

Ensminger: If this trend toward a smaller church membership but a more dedicated membership does in fact prevail, the church can move to a position of greater influence in the future. Coming back to education, I strongly believe that we need to get people when they come out of the educational institutions, instead of condoning government, to face up to the fact that I am the government. In a democracy, I am the government. Any individual can have great influence over change in an institution or beyond if they are prepared to take a stand. First get the facts, get themselves educated, and then build a power base from which to work. Then you can have great influence over change. But there is a complacency developed here that we cannot do anything about these things and this is my great concern.

Listening Panelist: I would agree in a sense with your statement that there must be a much broader-based education. But I want to ask you this. Are the typical liberal arts departments really concerned with developing graduate students rather than with having students confront the significant policy issues that their discipline would verify?

Ensminger: On this one, I would join you in saying that we need the liberal arts curriculum to be severely overhauled. But this does not change my basic concern in terms of people going out of educational institutions having a mind competent to understand, to deal with. I would join you on the curriculum and the orientation of the liberal arts schools.

Mr. Bundy: Gentlemen, I hate to stop this questioning period, because we have at least four men up here with questions unanswered, but we will have an opportunity this afternoon in that two-hour session. Thank you.

-- Edited by Richard M. Foster

CONTRIBUTIONS OF AGRICULTURAL BUSINESS AND INDUSTRIES TO STATE, NATIONAL, AND WORLD ECONOMICS

Harold Halcrow

The general theme of the presentation is that for the optimum development of the economy in this country, the new directions in education must work toward greater rural-urban interaction and understanding. This involves a more complete grasp of the total interdependence among the sectors of agriculture and between agriculture and other industries. The task is to more completely understand how local and state issues integrate with growth and prosperity in our nation and the world.

To put this into our immediate context, it means that we need both a broad understanding and education, with an emphasis on understanding the total economy. We also need skilled education in professions and vocations, and these must be increasingly effective as our economy becomes increasingly skilled and as it uses higher levels of capital and equipment of all kinds. So this places a task on all of us to be more efficient as educators, both in terms of our general understanding of the economy and of vocations in this economy.

My outline this morning is a rather simple one because I must first of all give emphasis to the agricultural business and industry sector of agriculture and relate something about it as it applies to agricultural development. Then I must place this in some kind of a policy perspective--what will happen in the future? And what are our options in policy? Then, third, what are the implications of this growth in agricultural business and industry for our profession of agricultural education?

If we look back on what has happened over the last fifty or fifty-five years, we are all aware that we have had a considerable increase in production in this country in terms of food and agriculture. And we generally measure this as an increase of about two and a half times since the early 1920's. Now this two and a half times increase in output did not occur because of increasing expansion of our cultivated acreage. The fact is our cultivated acreage has declined slightly or held almost steady, depending on how you measure it. It has not occurred because of increasing numbers of people going into farming or into the total sector of agriculture. For that matter, as we know, the population in agriculture has declined considerably, and the total employment in the broad sector of agriculture has also, on balance, declined--depending on how we define employment in this area. But the total food sector has expanded output two and a half times. What is behind this? That is our first question.

It has been said that the basic resource that we have in agriculture has been greatly upgraded by our system of land-grant colleges and our entire system of education in this area. I believe this is the most fundamental resource with which we are dealing, because this resource has made it possible to adopt other innovations that are highly productive in our American setting. The innovations of which we speak are largely of three kinds. One is the power machinery evolution which has occurred since the 1920's; a second is the evolution that has occured in terms of fertilizer and the use of fertilizers in this country; and a third is the evolution that has occurred in the area of pesticides. I want to show just a few little background graphs and tables, just to place those things in a perspective. Dave Williams has some papers that we ran off and to which you may wish to refer. I pass them out only for convenience in reference.

The first paper that you have in your hand is the little graph that I drew with my own hands, and consequently, it is not a very good one. But it will be much prettier when it is published! It is a record of the agricultural trends of trade and production since about 1910. On this graph, I have related the index of agricultural output to the parity ratio two years earlier. As you know, the parity ratio is the index of all agricultural prices divided by the index of prices paid by farmers for all inputs--interest, taxes, wages, and so on. We put the parity ratio two years earlier because we generally concede there is about a two-year lag in the agricultural output which results from the parity ratio. So looking on our graph, we have what I call "cluster A" (up here in the left-hand corner) which is the prime output or production from 1912 to 1922. It is seen as a period of rather slow growth.

Then we turn to "cluster B" (which is the little nebula just to the lower part of "A" and to the right) from 1923 through 1930 which shows the effect of the shift from horses to tractor power in the United States. You notice that it had relatively small impact on the total production.

"Cluster C" (which is again to the left and below) reflects the mixed influence of a severe drought from 1933 through 1936 and the crop control programs under the Roosevelt New Deal. But it also shows the most important jump in productivity from 1937 to 1941, resulting from fertilizer, hybrid corn, and further mechanization. So up until World War II what we had is what economists always looked upon as the "farm problem," which was the declining prices for farm products, rather slow growth in supply, but an even slower growth in demand.

"Cluster D" shows the jump in production associated with the cancelling of acreage allotments, transitional increase in commercial fertilizer, and the favorable prices and price guarantees of World War II and the post-war years. And, contrary to popular impression, productivity did not increase much during the war from 1942 to 1946, even though prices were favorable. Farmers enjoyed a few years of good weather and favorable prices but, except for the release of acreage from crop control in 1942 and the growth in fertilizer usage, very few new innovations were available. The year 1948 might be regarded as the first time that post-war technology became available, although the production potential did not appear in full force until about 1952.

From then on (as we see in one of the clusters that I have called "cluster E" on the diagram) a new plateau in production was established, while relative prices dropped due to the combined force of the innovations entering agriculture--fertilizer and new pesticides, especially.

"Cluster F" shows the effects of the advancing productivity of the more complete system of innovations pressing down hard against the parity ratio (including government payments) averaged around the lower levels of the 1920's and 1930's. I believe that the farm programs of this era did not fail--they were simply overcome by the marks of new innovations that proved attractive to producers.

"Cluster G," which covers most of the 1970's, shows only a relatively short upward movement in farm prices as lagged against output. In spite of the great increases in food demand from 1972 on, the increases in prices of farm inputs were sufficient to offset the effects of higher farm and food product prices. What we have then is a record of productivity stretching back over about sixty years, related to the innovations that came into agriculture and, as these innovations were put into use by the intelligence of the people who were operating in agriculture. We look upon these innovations that came largely from outside the farm sector as something that was added to the resources that we had in agriculture and education and other services.

Before we leave this series of graphs, or circles of clusters, I wish to refer to one or two things that are of immediate interest to us. You notice on the table which follows this little graph, we have listed the parity ratio by year. For 1975 I have listed a parity ratio of 91, which is actually the parity ratio of 1973 (it's 1975 lagging two years). We have heard a great deal about inflation in this particular period, yet as we look at this, the contribution there was a commodity inflation in agriculture.

I want to allude for just a moment to the first speaker this morning, speaking about inflation. As we look at it in our studies from the National Bureau and elsewhere, we had essentially a demand-pull inflation from about 1965 and 1966 to about 1969. It was created by an increase in government spending associated with the Viet Nam war, and an expansion in the money-credit system which was not matched by an increase in output of goods and services. So in the classical economic terms, this was a demand-pull inflation.

From 1969 on to about 1973, we have what is sometimes called in the business cycle now by economists the period of "stagflation." That is, when the economy grows at a somewhat slower rate and yet inflation continues to occur, and some parts of the economy actually stagnate. This part of the inflation was not caused generally by the increases in government spending. As you notice, the expenditures for the federal government tended to taper off at this stage. In fact, for the entire calendar year 1969 the federal government was running a surplus. What we have had since

1969 is, in essence, a commodity inflation, or what has been popularly called in some of our recent articles, an "administrative inflation" where the industrial sector and the organized wage earners are pushing prices up, even though there is no general increase in the quantity of money and credit as compared with the amounts of goods and services on hand.

The efforts of our government to control this kind of inflation by monetary and fiscal policies have resulted in stagflation and in unemployment. We might speculate on what other kinds of policies would be appropriate. That would take another half-hour here, which I do not have. But, in essence, there are more direct measures for control required for this kind of inflation--price control and wage control and the wage-price policy. The important point is that agriculture contributed only in a minor way to this period of inflation. In 1974 our prices dropped back again and in 1975 and 1976 they will drop back again if we have favorable weather. Now, our drought in the Great Plains may turn this around and we may have more commodity inflation. In essence, agriculture has not been the big contributor to the inflation of this period, except that we have enjoyed a great increase in foreign demand for plant products.

We could go into that a little more, but I want to follow my theme of the role of the agricultural business and industry sector and to pick that up, I want to turn to the fact that we did not have an increase in land use for about the last fifty to fifty-five years. Our growth has occurred from other sectors. I want to turn to the role of machinery and tractor power and the use of energy in agriculture.

Recent studies of the total consumption of energy in the power-food system have generally settled around the figure of about thirteen to fourteen percent of the total energy used in the United States. Thirteen to fourteen percent, it was estimated by the USDA in 1970, of all the energy used in the United States was being used by the food sector in America. But in the thirty-year period between 1940 and 1970 there was about a fifty percent increase in energy consumption in our food sector in each of these decades. Of the total 1970 usage, approximately twenty-four percent was absorbed in the manufacture and delivery of farm inputs. In farming itself, one-quarter of our total energy use in the power-food system was used by what we call the farm input industries, that is, manufacture of fertilizer, manufacture of machinery, manufacture of pesticides, and farming itself. Thirty-nine percent of the energy use has been for food processing and transportation, and manufacture of machinery and equipment for these purposes. Thirty-seven percent was used in commercial and home refrigeration and cooking and in the manufacture of equipment for these purposes.

A more functional breakdown, which has just appeared for 1973 (based on the total energy used outside of the farm output industry) allocated eighteen percent of this total to farming, thirty-three percent to food processing, only three percent to transportation of food and farm products, sixteen percent to wholesale and retail trade in food, and thirty percent to household use (mainly refrigeration and cooking). So if we talk about energy, the big things here are the processing, the refrigeration, the cooking of food, and also the delivery of farm inputs to the farm sector.

The farm sector is very important in this total picture, not because of the total amount of energy it uses, but because of the kind of energy it uses. The farm sector relies heavily on petroleum and natural gas. If we make a breakdown in the total 1970 use of fuel, we find that the requirements for general farm work amounted to a little over ten percent of the total energy used in the food system. Pumps and other equipment used for irrigation added another 1.6%; electricity used on farms added another three percent; the manufacture of fertilizer added another four percent; and the energy used in the manufacture of tractors, and so on... We would have to add that to the total picture in farming, but the point I wish to emphasize in this audit here is that the total use of energy in farming has apparently reached a plateau and leveled off.

In 1953, it is estimated that we were using 6.8 billion gallons of fuel in farm tractors. In 1965, twelve years later, we were still using 6.8 billion gallons of fuel in farm tractors, and I think the figures for 1975-76 might be just a little more than this, but not much. Our total usage on the farm, in other words, has tended to stabilize, and we are using power more efficiently as farm units have become larger, and as diesels have replaced gasoline tractors. We could go into much more detail on this, but this in essence is the figure that we have for farming itself.

In food processing, our energy use appears to be very closely related to the total volume of food going through the processing sector. Some parts of our food processing are more efficient than others. I have a number of tables on the energy use in, say, beet sugar processing, wet corn milling, and so on. These industries largely are converting a product into food. The major problem in the food-processing sector is not the total quantity of energy that is being used, but the kind of energy, which is largely petroleum and natural gas. If we want an energy policy for America, applying to the food sector, then, it must in some way provide a considerable stability in the energy supply both for direct use of petroleum and gasoline and for manufacture of fertilizer and other inputs that go into the agricultural sector. In other words, there is not much opportunity here for saving of energy in our total farm-food sector, but there is a great need for an energy policy that provides this energy at a stable level.

I want to make a comment now on our fertilizer innovations and the trend in fertilizer use in this country. If you will relate what we have on this table with what was said about output in agriculture, you can see that our jump in productivity corresponds very closely with our growth in fertilizer use in American agriculture. Up until 1940, our use of commercial fertilizer was rather low. It increased during World War II. We were just getting into this innovation at that time--but the greatest increase has occurred since World War II, and in all the levels of nutrients that we have. We project for 1980 a consumption of nitrogen fertilizer of 12½ million tons, as compared with a consumption of 7.2 million tons in 1970.

When people see a figure like this, they become a little worried about what energy is being used in agriculture again. According to the estimates we have, the total consumption of natural gas (which is the main industrial ingredient for American fertilizer) will still be only about three percent of our natural gas consumption in the United States. Looking again at energy policy, our problem probably is not so much to try to cut back on the use of natural gas and the consumption in the production of nitrogen fertilizer, as it is to have an energy policy that assures this particular ingredient for agriculture and that saves natural gas outside of agriculture.

As we look at phosphates and potash, these are largely mined materials, and the key problem here is exploiting the resources that are known. Some of the resources are enormous. There are additional resources, of course, that have been recently discovered, and they are very large indeed.

I want next to turn to some short comments on pesticides. The product pesticide has had a tremendous impact on our output in this country. And, as we have measured the marginal product arising out of the use of pesticide, it is again enormous. As we put pesticides on top of fertilizer and on top of the kind of mechanical and power revolution that we have had, we see that all these go together to produce what we have in this country. Some of the marginal rates of return are given on the table that is shown on the board here. The essence of it is that modern agriculture really can not live without it. Some people talk about cutting back on the use of pesticides, cutting back on the use of fertilizer, cutting back on the use of power, and so forth. I do not think we can turn the clock back in this regard. The problem is to make efficient and safe use of the materials that we have. This means a greater attention to the techniques of use and a greater attention to study and to knowledge of good use, and in some cases, more strict control over the use. People in the industry do not like control, but they admit that control is necessary. The problem is not to banish the control, but to have controls that are intelligent and efficient and not counter-productive and to help in understanding of how these things can be most effectively controlled.

I must leave this particular point now to turn to my second point, and to raise these questions. What do we want to have happen in the future? What are some of the goals that we see ahead for American agriculture? How do these goals relate to the work that we have in education? We have heard a great deal about the world food problem. You have heard a great deal about how our trade has expanded in the past four or five years and how this trade has contributed to improvement in the balance of trade for our country and how agriculture has been able to supply an increasing amount of goods for exports and sales to other countries. We have also heard a good deal about what our aid program ought to be.

As we look at these questions, to put them in some kind of perspective, it appears that we have three goals that we must in some way satisfy. The goals for a continuing, good food supply for the American public--if we do not supply this, we cannot carry out a consistent export policy, either for money or for aid, and so this goal must be held uppermost in our planning of policy for agriculture. And, secondly, we must recognize that agriculture is one of the major earners of foreign exchange that we have in this country. If we look at the comparative advantages that we have, agriculture must rank high in any mix that we have, so we recognize this as a goal. We recognize also the need for aid and the need for development abroad in the world. And I believe this last goal gives us the most difficulty in formulating a rational goal for America.

We have tended in the past to look upon aid partly as a way of disposing of food surpluses. We have tended to look upon aid with compassion. We have tended to look on aid as a necessary part of our total national policy. But we have tended to make simplifying assumptions about it. You often hear people saying, "Well, we can't feed the world." You hear people saying, "Well, what can we do? The world food problem is so immense." We must make sense out of these two conflicting comments. We must recognize, I believe, that the projection made by the FAO and our Economic Research Service is that the food deficit of the developing countries is apt to grow in the next ten to fifteen or twenty years.

The FAO has a projection of a grain deficit of 80 to 100 million tons of grain for the developing countries by about 1985. And if we in America were to supply our proportional part of that deficit, that would mean that we would be exporting some thirty to forty million tons of grains to the developing countries, which is a considerable increase over what we are doing now. Probably this deficit will go beyond 1985 to 1990 and the year 2000. We face a very difficult question in what part we are going to play in that.

I believe that I must agree with Dr. Ensminger that we must approach this problem as a problem in humanity. We must approach it with compassion. We must try to help the developing countries achieve a rate of development and a control over the rate of population increase. We also must make a hard decision that we are going to have to export an increasing amount of our agricultural products to these countries if we are going to avoid large-scale starvation and much greater difficulties in the world at large. This means that we must participate more effectively in things such as the World Food Council that was developed after the Rome conference. It must be that we give up some of our nationalistic goals, and that we participate more as a leading nation in the world and as a responsible nation. If we don't, I think the penalty will be very great, not only for us, but for other people in the world.

We do face, of course, some compensating things in this area. We recognize that the estimates of our needs for importing non-energy materials are high. There have been estimates given that we may have to import something like $50 billion worth of non-energy materials and non-energy minerals by the year 2000. How are we going to pay for this? Well, food is one way that we can help pay for it. A lot of the non-energy minerals are in the developing countries. So they have an opportunity for developing their economies. We do have, then, a need to mix the goals of economic development and an abundant food supply in America with the goal of increased export trade to other countries and with the goal of food aid and economic development for developing countries of the world. All of this places a challenge, not only for liberal education, but for efficient vocational and industrial education, as well as a general knowledge of the policy problems that we face.

--Edited by Richard M. Foster

TRENDS, ISSUES AND NEW DIRECTIONS IN AMERICAN EDUCATION

Dr. Ralph Tyler

There are two main problems in this topic assigned today. One problem is that there is a lot that could be said. But it is not possible to say a lot in the time available. I am reminded of two things my father (who was a minister) taught me. One was there are no souls saved after thirty-five minutes. The other was the case of the young minister who came out to western Nebraska where we lived. He had just come out of the seminary and he was anxious to do a good job when he preached his first sermon. He came in January, and the first Sunday brought a heavy blizzard, and only one rancher showed up. He said to the rancher, "Well, shall I go ahead with the service as planned?" The rancher said, "Well, if I went out to the feedlot and only one steer showed up, I'd feed him." So he thought--surely Jesus was just as concerned with the one lamb as with the ninety and nine, so he went ahead with the service exactly as he had planned it. When it was over, he came down out of the pulpit to shake hands with the one member of the congregation and he said, "Well, what did you think about the service?" "Well," the rancher said, "as I said, if I went out to the feedlot and only one steer showed up, I'd feed him--but I wouldn't throw the whole load at him!"

The other problem is that no one can predict future trends and developments with any real accuracy. Some of the things predicted will no doubt come true if we are familiar with what is going on, but, as Kenneth Boulding said in another conference devoted to the future in society and education, one of the things we have learned over the generations is that the future is always full of surprises. So there will always be inaccuracies in any effort to predict the future over any length of time.

I want to begin by talking first about trends that lie outside of educational institutions as such, because I think it is pretty well established from historic experience that educational institutions, as with most institutions, rarely make fundamental changes from within. This is because the tendency of institutions is to become bureaucratized, and the individuals in it to try to protect their interests. For them, the best thing is, if they can't move ahead, to at least maintain the status quo. They become less and less responsive to the clientele that they are supposed to teach, as in the case of schools or colleges. So the big changes usually come as responses to pressures from the outside. If the responses are highly effective, it is because of creative leadership from within that is able to mount a response to those outside pressures.

The best illustration, I think, with which we are all familiar is the land-grant colleges. By 1862, the developing agricultural and mechanical classes as they called the lower middle sector of the population at that time, that is, the people, the farmers, the small shop owners and other mechanical classes of the times had gained enough political power to push for educational opportunities for their young people. Their boys wanted to go to college. The Ivy League colleges would not admit them, taking the general view that they really were not college caliber. They did not know Greek and Latin, so how could they possibly benefit from a college education? Unable to get this response from the private colleges, they exerted pressure on the federal government, as people do in the present time. They persuaded Senator Morrill from Vermont to introduce a bill that would offer any state that would establish a college for the agricultural and mechanical classes some of the land that was accumulating in the West as our frontier moved westward. And so the land-grant colleges were formed as a response to the political pressure of the growing power base (that Doug Ensminger maintains is now largely also farmers) bent upon getting the education for their young people.

If you read the diary of one of the professors of Michigan State, the first of the land-grant colleges, you will find that they had a great deal of trouble trying to figure out how to educate young people at the college level coming from differing backgrounds. And the leadership in figuring out ways, for example, of finding that you could motivate young people to study chemistry if they could see its connection with a farm problem that they faced--in which you could get the effective education if you worked at it, devised colleges that were effective for the purposes intended.

I mention this illustration at a little greater length that I can use for the others because it illustrates the point that I think is very important as we look at social institutions. That is that most of the changes that are significant are creative responses developing from leadership within, but they are responses to outside pressures. So let's look at the outside as we look ahead.

We have already been reminded yesterday by Professor Havighurst about the nature of our population and the student population. It is stable with the birth rate as it is now, and any great change is not projected. We will not expect to have the continuing growth in numbers that has characterized so many of the educational problems of schools and colleges.

We will have, as pointed out by Dr. Starleaf this morning, a relatively stable economy. There is not the demand for products that comes from internal growth in population. We cannot look for, it seems to me, the tremendous problems associated with education during the Depression, which were a combination then of great increases in enrollment (because young people could not find jobs) and much lower income. I was at The Ohio State University when the Depression hit. In 1929 the University received from the legislature the largest biennial budget it had ever received. In those days the legislature met only once every two years. So, in 1931, after long months of deliberation and arguing and fighting but not seeing where the money could come from, they cut the budget of The Ohio State University for the next biennium by exactly fifty percent. And I saw sixty percent of the faculty, usually at the younger age levels, unfortunately, go on the welfare rolls and in the soup kitchens and so on. I do not think that we will have that kind of an unstable economy, but I do not look for any great improvement in the economic situation. This means that we will not be able to look for a marked increase in funds for supporting educational institutions. Our improved educational system will have to come from better use of the resources that we have, rather than looking for more resources from state, local, federal, or private sources.

The third trend is one that has been accentuated in the last ten years, although it has been slowly developing for the last thirty-five or forty years. It is the continued erosion of the total educational system. We get so used to talking about the school and the college as the educational system that we forget that we grew up--and moral young people throughout the world grow up--and learn through experiences that are provided by a number of institutions and organizations, not just the school. The things one learns in the home, the things one learns in initial employment, the things one learns in religious institutions, the things learned in the neighborhood or with various types of mass media are an important part of the educational development of many young people. In fact, those outside of school, in terms of time, always have made up more than that within school. In terms of importance, it is the total system that should be operated with effectiveness, not just part of it.

Now we see a rapid erosion. In 1940 about twelve or thirteen percent of mothers of school-age children were in the labor force. A considerable number of children that I have seen in the schools I have visited go home after school and there is nobody there. They are called "latch key" children. There is nobody providing the supporting sort of education that used to be available. The school does its part, but the rest of society has its responsibilities, too.

Now when you see any inadequacies in the learning or education of kids the tendency is to blame the schools without noting that the school still has 1100 hours a year of a typical child's time. But, the television now gets (according to the studies by Schramm and Parker) 1500 hours a year of the child's time, which is more than the school gets. Actual supervision from the home takes up much less time, on the average. The role of religious institutions and others seems to be dropping. So I predict that this erosion will continue for a time. But because parents do care about their children (they are not letting them do this just because they do not care) there is going to be more concern and more effort to figure out how to provide an adequate educational environment for children.

There is going to be an increase in employment in the service sector. We have seen this predicted, of course, in connection with the drop in the numbers employed, or at least the percentage employed, in the agricultural sector and the material production sector. This, of course, has several consequences for education. It means, for example, that the intellectual and social skills are more important in employment than ever before. There will be a continuing reduction in the demand for manual skills, manual dexterity and physical strength. These have been, bit by bit, taken over by various kinds of technological devices. There is going to be, as has been suggested by Starleaf this morning, a continuing relatively high level of unemployment in the private sector. As he pointed out, it is hard to determine just what is the actual level of unemployment, if you call real unemployment the inability to get a job, rather than a period of time in between jobs. However, there is going to be a continuing relatively high level of unemployment in the private sector.

There is going to be a continuing high demand for education for two reasons. One is that with the kinds of occupational requirements necessary for increased employment in the service sector, more education is needed. In addition, most of the production and distribution sector is made up of occupations that require a good deal of training and understanding. It is necessary to remember that the service sector right now is most largely made up of health services, educational services, recreational services, accounting services, social services, and administration in science and engineering. These areas all require more education than is required, on the average, by the productive sector. There is also the demand because more and more people want education for their children. Again, if you will look at the public opinion polls you will find that over ninety percent of parents want education for their children. Eighty-seven percent hope that their children would get into college. So the demand is pushed both by wanting education and by the need for it in connection with future trends in employment.

There is going to be an increase in the number of people involved in continuing education. You may have seen the report, which I believe was distributed by some commission of the American Council on Education, on the number of organizations that provide continuing education. This number has been increasing. For example, one corporation, IBM, spends $80 million a year on the continuing education of its personnel in the areas of executive training, additional science and technology for its researchers, and so forth, with much of that being contracted to nearby universities or community colleges. This is typical of others, as well. The largest, in terms of actual numbers, is the Department of Defense. The Community College of the Air Force at Randolph Air Force Base, with its accredited programs (part of it being in the actual training programs within the service, and the other part contracted with nearby community colleges) is one of the larger illustrations of this.

There is going to be a continuing concern for certain special problems that our generation has discovered. Education of the disadvantaged, that is, young people who come from backgrounds where there has not been education in the home and who have not seen any demonstration of the value of education. We took that for granted when, back a century ago, eighty percent of the occupations were unskilled. Tom Sawyer, you will remember, felt so envious of Huck Finn who didn't have to go to school. He didn't have to because he could get a job and do what was required without going to school. But that day has passed and we now refer to Huck Finns and others as disadvantaged children, requiring special effort if the school is to learn how to reach them.

There is going to be continuing concern for career education, and occupational development because of the increasing separation between the opportunities for children and youth to come into contact with the world of work. As you have seen, some of the studies of communities show how little the young people know of the world of work going on around them, especially if it goes on in some part of their metropolitan area where they do not live.

There is going to be increasing concern for character development, for the reasons pointed out by Ensminger, stemming from the great increase in the reported violence, in crime, in delinquency and so on. For a time this will be blamed on the schools, but again there will be a need for looking at the total educational system to see what can be done about it.

There is going to be continuing concern for the effective transition of youth into constructive adult roles, leading to a wider range of interest groups. You see interest groups have a stake in education and want to influence it in some way. For a long time, the groups interested in education were relatively small in number. The upper middle-class expected their children to get their roles in life through the efforts of their parents or relatives getting them into apprentice programs or other kinds of occupational opportunities. Now education (schooling) is seen as an important thing to many groups. They are willing to exert the efforts to influence the nature of education, therefore becoming various kinds of pressure and power groups.

Turning to the issues, I think I have suggested some of them that will be with us for a long time. The level of financing for public schools and colleges, the role of public collection of taxation for education, and the demand for the other kinds of social services, which are increasing in this country as well as in other parts of the world, are only a few of the issues. We reach a point where, unless you have a utilitarian state that can enforce collection of taxes far beyond what people are willing to give, you find that they get to the point where about fifty percent of the average person's income goes to taxation. Sweden is a socialist state with a free system of taxation. They have found taxpayer resistance. The people want to have a chance to decide, personally, what they are going to do with the other fifty percent. It is not that they want to save it. In Sweden, as in the United States, about 93% spend all they have, sometimes a little more than they have. It is not that they want to save it, but they want to feel that it is their money and they can make the decisions. When we keep adding new services that are provided by taxation it reduces the opportunity for the person to feel that he is spending his money. So, with the increased demand for police protection, for health services, for a whole series of services, our public schools and colleges are going to be finding it very important to figure out ways of getting funds that will not represent taxpayer resistance.

Another issue is one that I have already suggested, that is ways of rebuilding the comprehensive educational system. As we have greater freedom for women to engage in the whole range of occupations, the question as to whether the home can assume the responsibility and, if it does, is it equally the father's and/or the mother's responsibility?

The question of how we build other social institutions such as the youth organization, has been dealt with in the Communist countries. In Russia, for example, the school goes from nine o'clock to three. From three to eight in the evening, the younger children are under the control of the Young Pioneers. For children over fourteen years of age, activities are led by the Communsa. They have educational programs related to what they call the development of occupational skills, or the development of what they call Communist character. The things that we have done in the past through our less formal institutions, are provided for in the Communist states by a special professional group who are given a clear notion of what their objectives are. I spent some time in the Curriculum Center for Communist Character, and they had developed a character education program which they believe relevant for their youth. We will have to face the question, "how are we going to rebuild our educational system?" I do not think the public will long endure a feeling that many of the things important for their children to learn are not being taught in the present system.

Developing new patterns of education, both for adults and for youth, while maintaining quality is another issue. There is a great deal of non-traditional education, and people are beginning to question that some of this may be of low quality, not really worth very much. The effort to try to devise patterns that will provide for a quality education is an important issue.

Another issue, which is essentially an age-old problem of democratic countries, is how to balance equality and freedom. Equality often means limiting the freedom of others. At what point is that balance reached is a very difficult issue that comes up repeatedly. You get it, for example, in the issue that is now raising its head in the discussions in Congress and especially in the more affluent parts of our society, whether to establish special schools for the gifted and then others for the disadvantaged. The feeling is that the young people who are gifted ought to have special opportunities to excell and not be put in the same schools with those who are less gifted. That kind of issue I think will continue if our affluence is continued.

The question of how to balance or integrate so-called liberal education and occupational education will continue to be an issue, because we have long had ideals about what our goals are, as has been expressed here today several times. Some of the questions indicate the problems concerned. As Dewey pointed out at the turn of the century, in many cases the liberal arts colleges have become narrow vocational schools for the particular traditional subjects they teach. At the other extreme, the occupational programs, although offering great opportunity to be liberal, have become narrow. The question of how to obtain a balance of the breadth that is involved in being a citizen in a democratic society and a responsible participant in occupational life is a continuing issue before us.

New directions? I have only a few minutes to comment on a few of them. One that I think is quite relevant to what we are talking about here and is indicated by some of the proposals like those of Willard Wirtz in his book, Boundless Resource, is namely that human resources are a boundless source. There is a need for some broader advisory or planning council--broader than the local school district so that there can be an opportunity to develop a more comprehensive plan for occupational education appropriate for a range of occupations. Very few young people are actually going to live as adults in the particular community which now has exclusive jurisdiction over their education. There is more and more talk about community and metropolitan councils, sometimes state councils, to provide for the planning of occupational experiences in education.

The non-traditional programs of continuing education will see new directions in many places. England with its open university and Israel with its Every Man's University, are illustrations at the university level. We have a number in this country, like the Empire State College as part of the New York State University system. The practice of feeling that whenever a problem comes up, everybody has to work on it, is increasingly being replaced by identifying the particular problems of particular schools. There goes along with it, I believe, an increasing development of a system of management by objectives for the school administrator that is not talking primarily about input objectives, but talking about things to be learned by young people and the way in which they can be managed, so that you can identify where the problem lies. This means only the management by objectives system--a cooperative setting of realistic goals.

To give an illustration, I worked for three years in one of the worst ghettos in Detroit several years ago. We found that at that particular time, at the end of third grade, when the expectation has been that all children by the end of third grade can handle the mechanics of reading and are ready to go on and be reading in the content areas, that only 35% could do so. Now just the statement, "We should do better" isn't good enough.

The statement "We should get 100% in a year" is not realistic, because it can not be achieved. What we did, working with the parents' committee and the teachers, was begin to agree what would be reasonable. If we can move from 35% this year to 45% next year to 55% or some such figure each year we re-examine it, then that is what management by objectives is--setting and obtaining realistic goals. When they reached their goal three years later in which those children were doing as well as the white children in the adjoining area of Detroit, the parents were so pleased they had a big dinner and a ball for the teachers who had made this all possible. Now this is what I mean by talking about management by realistic objectives rather than setting goals without the question of how far you can go with it.

Finally, there will be more development of patterns for showing of financial support. Patterns ranging all the way from what is being done in some states in the sharing, by deciding that people in the upper middle class income range can pay a larger tuition rate at the colleges or universities than those with limited incomes, by getting more opportunity to reduce the total burden on the taxpayer, and by the development of other kinds of sharing.

You can see the problems of distinguishing between what one can objectively see might happen, with what one might wish to happen. My time is up.

--Edited by Richard M. Foster

INTERACTION VI: Harold Halcrow and Ralph Tyler

Listening Panelist: Dr. Tyler, you mentioned that some of the Communist countries were using character-building educational systems. Have you got any recommendations for how we might use the system or if it is a good system in our educational system?

Tyler: We have a voluntary system now in many rural areas that has been relatively effective--the 4-H clubs. As you know, I am a member of the national committee on 4-H clubs and have had a good deal of connection with them. Douglas Ensminger has had many years before, and many of you have, and that represents a kind of after-school additional education--where the actual production of something or the various efforts are made to help to develop such character patterns as responsibility, honesty, and the according results. This is one thing that has already developed here. But unfortunately, it does not reach a very large percentage of youth any more. It is much harder to organize, realistically, in a city environment than it is in a rural area--especially when the city parents do not have any resources to help the kid have a sow or some other kind of animal or a crop he can take over.

Listening Panelist: I have heard it said, in various seminars, that our exports of grain about balance our imports of oil. What I want to know is who gets the grain money and who pays for the oil?

Halcrow: Exports of grain do not necessarily balance imports of oil, nor does it have to. Exports of grain have increased rapidly since 1971. This is generally attributed to (1) devaluation of our dollar which has loosened up the whole trade area, (2) some odd purchases by buyers who happened to be in the market for it, particularly Russia, and then (3) just a general loosening in the expansion of trade. Our whole agricultural development of the past three years has been sparked, in other words, by an increase in demand. Now, this grain has contributed to our balance of trade. At the same time, we have had an increase in the purchase of oil. My feeling is, and I think the trends are in this direction, that in the future, we are going to be importing more oil rather than less. Consequently, we are going to want to have a way of paying for this. I believe that the commercial exports of agriculture are going to be still more important in the future than they have been in the past.

Listening Panelist: Continental Grain gets some of that money for the grain that is exported and I help pay for the oil that is imported. Is that the way it is balanced?

Tyler: He is not taking into account the role of government and taxation to see that the persons who have excess income are able to pay for someone who has less.

Halcrow: Continental Grain is one of the large firms that exported grain, but they call it competitive basis. Now that is good business, and business has improved.

Listening Panelist: I do not know why they call it good. Seems like it has improved for business, for Continental and the others, but it has not improved any for me.

Halcrow: Well, we are using grain that helps pay for some of our increase in inputs. We are going to have to use more of it in the future--that is the point.

Tyler: I think his point is, he does not understand within the domestic economy how the haves and have-nots get more balanced. The simple answer is that it is one of the functions of taxation. For example, another illustration is that all this borrowing of federal money; somebody is getting interest on that money and the question is, how do you tax it?

Listening Panelist: I knew I shouldn't have asked an economist that question!

Tyler: Well, I am not an economist.

Listening Panelist: There is no free-lance? Everything has to be paid for?

Halcrow: Yes. I was interested in Dr. Tyler's comment about rebuilding the comprehensive educational system which includes not only the formal aspects of education at all levels, but also community, etcetera. Now I wonder if you would identify a few of the major changes that you think should be made in high school--the formal high school programs--in order to better fit what you call the comprehensive school.

Tyler: I do not want to take too many minutes but let me make four statements. One is, if you are talking about the high school level, some of the most obvious inadequacies are the lack of responsibility. As the young person begins to realize he is becoming an adult, he is physically mature, he wants to have some responsibility for the actions. More and more he has been isolated from adults and he has not had much responsibility. So I see one thing in the case, for example, of occupational education, a much greater increase in cooperative programs where the young person works for part of the day, or part of the week or part of the year, and thus is taking responsibility. The role of the school is helping to understand what is going on and to appreciate it and get the broader view of what this occupation is that he is working in. Another one, which is being done by a number of places--Bob Havighurst mentioned that yesterday--"action-learning" as it is often called, where young people may be giving voluntary service. For example, we looked at the case of a Minnesota town--not very large, but with a number of retired people--where they were giving volunteer service helping retired people with various kinds of problems--getting a sense of responsibility, seeing the consequences when they forgot their responsibilities and did not get there. They suffered--they saw the consequences of it. That is one illustration. Another one, after all, is television. It now represents the largest time-consumer of children and youth's time, and could be a much more effective educational instrument if there were more efforts by the community to help provide the kind of TV that would illuminate some of their own problems, that would not simply be relief or just whiling away the time...there is not much difference. The average TV program that many kids see is not much different from just sitting on the street corner and whittling away at something, and watching things go by. It requires no great thoughtfulness. You do not really see any issues that you can do anything about so the leisure time could be made much more constructive than it has been. It does seem to me that it requires some kind of a way by which the school and other community agencies work together, taking responsibility for sharing in the education of their youth. Some of the community schools that are in the community school association, that is supported by the Mott Foundation, has its headquarters in Flint. Some of these community schools have worked out that kind of arrangement.

But you have a chance in Iowa to pioneer in figuring out your community. How can you work it out so that there is more effort to provide opportunities that are meaningful and educational for youth?

Listening Panelist: You are giving support to year-round education or a very flexible sort of program over a period of years?

Tyler: Yes.

Listening Panelist: Dr. Halcrow, I would just like to know, you assessed the impact of fertilizers, pesticides and machinery upon changes in agriculture and growth. And you gave some measures. Do you have any measures about the educational input into those three dimensions as far as gaining acceptance and so forth? In other words, this could not have held out without education. Do you have any measure of that?

Halcrow: No, not specifically. And this is one of the things I wish we did have. But we know that underlying the whole thing is the educational process and it is the most fundamental of all. I think we all recognize that, but it is extremely difficult to measure.

Listening Panelist: Do you see any movement where educators and economists, for example, who are educators also, would get together on trying to measure some of those inputs that education has?

Halcrow: People have had to do this. I talked with one of my colleagues whom I esteem most highly--also a University of Chicago Ph.D.--just about four years ago. He said he had been struggling with this question and he had not been able to put a quantitative measurement on the productivity of, say, the Cooperative Extension Service. He had tried every way to do it, because he felt it was productive, but he could not measure it.

Tyler: There are not any micro-measures that are very adequate, so you cannot aggregate them.

Listening Panelist: Should this not be something that educators should be working toward in the years to come, so we can do this?

Halcrow: We wish we could. The problem in trying to estimate the productivity of education is that education is such a pervasive thing. It is involved in almost everything we do. I know I am more efficient being educated than I was when I was not educated, let us say, but how do I put a marginal product on that? Now we do have estimates of the productivity of education, the economy as a whole, and I do not have those figures with me, but they are high. That is, what we call the investments in human capital. A considerable amount of work has been done on that in recent years. Generally, they show that the marginal product of a dollar invested in elementary and secondary education is something like fifteen or twenty percent return on investment for the economy as a whole, but so far we have not been able to break that down to individual occupations.

Listening Panelist: Well, Harold has already asked my question, but I would like to put it in different terms. I like your three charts, relating agricultural production to the use of pesticides, to fertilizers, and so on. While you were doing it, I was dwelling on hopes that you would get two more charts relating fuller production in agriculture to the capacity to innovate, to produce innovations, and the capacity to use them. And you partially answered that question already. Yet the focus, I think, sir, of this conference, it seems to me, that somewhere by the year 2000 (and, after all, we are projecting in the future, not what we can do now) it seems to me that we can decide, or try to decide, if that capacity is limited or unlimited. And if it is limited, then we will not move to the year 2000 in any linear projection of where we are today. It also seems to me that we ought to decide whether these capacities are fixed or variable. Whether they are independent variables or dependent variables. It seems to me that we need to know a lot more about the capacity to innovate and the capacity to use innovations.

Halcrow: Yes. I wish I had time to go into that. One of the largest chapters in the book that is coming out is "Human Resource and Income Policies." In this I do go into considerable discussion of agricultural education, and the whole investment in human resources--investment in human capital. And the conclusion is that all of these investments are highly productive and have been among the most productive in our total economy, but I cannot put a specific figure on it. Now, with regard to your question--every resource is limited, which means measurable. But some resources are more expansible than others, and the human resource is one that is capable of the greatest expansion. Consequently, when we look at the year 2000 or any other year ahead, we lay a great deal of stress on the investment that can be made in human resources. Human resources are complimentary to other resources. We can put our finger on pesticides and fertilizer and say, "If you put in this much fertilizer, you will get this much out."

Listening Panelist: I think the procedures used in this have been regression techniques which have been measures of the residual, which can be called the measures of our ignorance. The residual is the thing we cannot explain.

Second Listening Panelist: I was just wondering what we are going to do with Merrill Anderson's grain back there! I think that still we need to come back to the realization that our production of grain is where we have a relative advantage. I am still unclear as to who is going to purchase this grain. If Merrill cannot continue to realize a profit, he is not going to produce. I think the farmer is too fiercely independent.

Halcrow: Well, he has to have a profit, or he had better get into some other business. Three people are going to compete for his grain. One is our domestic economy and particularly our livestock economy, and this composes our domestic demand. The other is our need to have foreign exchange. This means our exports. The third is what do we do about an aid in developing programs in the developing countries. All three of these demands are expandable. The problem that all the farmers are going to run into is, are they going to be able to hold their costs in line with an increase in demand? And the long-run answer is "yes," but at the same time, if costs move up very rapidly, agriculture is going to have some trouble. We know, in the short run, there are times.

Listening Panelist: I would like to address a question to Dr. Tyler. You have given us some kind of a diagnosis as to perhaps what is wrong with some of our more comprehensive institutions. You have indicated that we need to rebuild our comprehensive educational systems. You have indicated that perhaps we are leveling off in terms of available financial resources for our public educational systems. I am in agreement with all of those. Now my question is, how do we do this rebuilding? How do we do this restructuring? How do we get change short of buying it without any more resources?

Tyler: Well, I said we are not going to get support from all the sources. The 4-H program, for example, uses a great many volunteer people. We had a dialogue at our center for the study of democratic institutions not long ago, on the Canadian National Health Program. The first effect of the Canadian National Health Program (as you would imagine--the same thing would happen in education) was doubling the income of doctors, because the first thing is, the institution wants things for itself. The second thing was that there were more of the very lowest-income people getting medical services. But there then began to be the question of how you are really going to get better health, because doctors do only a part of it. An increasing number of volunteers helped with health services. For example, the most or best known was Alcoholics Anonymous. Doctors can do some things with regard to alcoholism which is (as Doug pointed out) one of the serious American problems--not as high as Sweden, which has the highest alcoholic rate in the world--but it is a serious problem. The Alcoholics Anonymous have been that group between the professionals and the client that has helped to make that possible. Now we then held a dialogue at our center because there is a man at Northwestern University in the Urban Study Center who has been studying these health-help groups and he has found around two hundred and seventy of these volunteer self-help groups that are helping to bridge the gap between the highly professional needs and the needs of the client--the highly professional competence and the needs of the client. This, of course, is what our educational system used to be, the part that was not the school. The parents did not get special pay for helping to bring up their children. Sunday school teachers, at least in my day, (I used to be a Sunday school teacher) did not get any special pay. There are lots of ways by which we can help to build the structure which do not require public funds put into it.

Listening Panelist: Dr. Halcrow, when you stated that there does not appear to be much chance to save energy in the agricultural sector, do you mean by this that we cannot develop more efficient use of the energy that we have, or is it a relative thing in the total economy that you are talking about?

Halcrow: It is a relative thing. The energy use of the agricultural sector has stabilized, particularly in farming, and as a percentage of the total energy used, the food sector seems to be declining. Now, we can save energy by more efficient use. And as we go on into the farm sector, you have diesels that are generally more efficient than gasoline tractors. If you are going to refrigerate food, however, and have a high-level food supply, it is going to take power for refrigeration, for management, for storage, and there does not seem to be much way to get around that.

Listening Panelist: Dr. Halcrow, you mentioned that you thought there should be some long-range food planning, agricultural policy planning, this type of thing. Who are you going to delegate the responsibility to to arrive at this policy? The Department of Agriculture? Educational institutions? Economists?

Halcrow: Well, that depends upon whom we delegate it to, because we can delegate it as we choose. That is, the Congress will make the decisions.

Listening Panelist: Who are you suggesting should have that responsibility?

Halcrow: Well, I think producers ought to be represented. For example, if we have a National Food Board or a World Food Board, producers ought to be well-represented on it. Consumers ought to be represented. Independent people, let us say, ought to be represented on it. Really, if we are going to continue to supply a very large and growing export market, and if we are going to play a role in development of the developing countries, and at the same time we are going to have a stable and a reliable food supply, we have to have some kind of food management policy--which may involve larger reserves. Farmers have objected to the government reserve program largely because, in essence, we did not have such a policy. But when we have large reserves, we tended to pitch them onto the market regardless of whether the market was there or not. At the end of the 1960's, for example, we were rid of the large food stocks, the large grain stocks, and all we heard was how expensive it was to carry these stocks. Well, as a matter of fact, it would have been much less expensive to carry these stocks, to stabilize the market at a higher level, than it was to do some other things that we have done. But we did not make any fundamental decisions about what size of stocks we can carry, where we should carry them, how we should carry them, or how we should manage them. Well, what I am saying is that we need to do that.

Listening Panelist: Do you think that this is already an implied responsibility to the Department of Agriculture, for example?

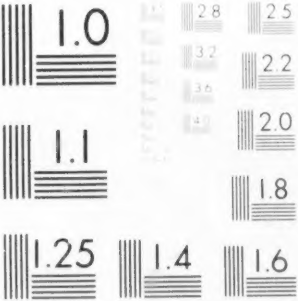
Halcrow: It is sort of implied that the Department of AgricIture has never been given assurance that they would have money to carry stocks or to carry out a consistent policy in regard to their management. Consequently, when the Department of Agriculture got itself in a bind, they were trying to liquidate stocks in order to protect their own budget. This goes back to my central theme. That is if we are going to have an effective food policy in this country, we must have a broader understanding, a more general understanding of the things that are required to bring it about.

Listening Panelist: So we will have to appoint a new committee?

Halcrow: Well, I am not saying that exactly. You have to have somebody to do a job. If you want a job, you have to have somebody to do it.

Listening Panelist: Dr. Tyler, you mentioned the reading program in Detroit. Was there any incentive or reward to the teachers for having achieved that and if there was, would you endorse this type of a program?

Tyler: When I agreed to serve as consultant on that, the first thing I did was to go to the teachers' union and ask them for permission to recruit some volunteers. I pointed out to them the serious problem. The parents were saying they had no confidence in the schools, "you can't teach," and "our kids aren't learning." With those kinds of pressures on the teachers' union, they agreed with some reluctance. Then I recruited people to teach in those four elementary schools who were really interested in attacking the problem. They said afterwards they worked harder than they had ever worked, but they had more fun out of it. There are lots of people in any organization who seem to be only trying to get along so people have to work as little as possible, but there are always some people in an organization who are challenged by difficult problems, who want to do something. You see, these young children here want to learn and they are not being helped to learn and they want to do something. That is why I believe that a strategy that schools must use is the strategy of saying, "We're not just one bureaucracy--everybody alike. We've got some problems and people who want them challenged." That is what I mean by a task force to work on special problems. They get a kick out of it; they are enthusiastic about it; they are learning something. They said afterwards it was one of the most interesting periods of their professional life. That is one way I think you can get persons for whom the incentive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is the challenge of doing a difficult thing for people who really need their services.

Listening Panelist: Dr. Tyler, practically every speaker in some shape or form has said something about continuing education. As you see continuing education, would you elaborate upon it as far as future developments are concerned?

Tyler: Well, I do not think we need any further discussion about the needs. The changing society, the interest of people in continuing to learn is growing, but the problems it seems to me are of three sorts. One problem is to identify the particular audiences. I had the privilege a year ago of participating in a training seminar in Israel to train some twenty people who were being prepared to staff a new year in the Ministry of Education on planning and evaluation. It happened that they were also starting the Every Man's University there--a new venture in adult education, or continuing education. So we took it upon ourselves and got permission from Every Man's University to have our seminar project that people could work on to be the actual development of a plan--of planning and evaluation for that university. We found that they had started out already and had a lot of syllabi being drawn for courses by professors deciding what they thought the people wanted and needed. We made a quick survey--sampling, interviewing. After all, Israel is only the size of Chicago in population, so it is not a very difficult job to sample the whole country with a reasonably dependable sample. We found that the things that people felt they wanted to learn, were prepared to invest time and so on in, were not the same subjects as were being planned for them. For example, university planners thought they would be deeply interested in science. Well, until they developed a program of science which seems understandable to people, that was not the case. The proportion that wanted anything in science was, at that time as I recall, about five percent. I think many continuing education programs in universities, except for those like the agricultural extension service, are not mandated by persons who wanted them. In any event, we found that in terms of the evaluation--finding out who wants what--a lot of the continuing education courses are ideas of the professors about courses they would like to teach, rather than ideas about who wants what and how we can help provide those services.

A second problem is, after you have identified your audience and the subject that they simply want to learn, how can you develop significant curriculum, appropriate goals, so that what they really learn will be significant and helpful for them in the future...goals that can be achieved step-by-step in a meaningful fashion? A program that does not take any more time or energy than they can put forth, but is challenging so that they are not just the way some teacher education programs and service have been in the cities--where if you could sleep through several sessions you are given promotional credit for it--not that kind of program, but one where they have really learned something from it. Then the means of evaluation is to keep in touch and keep improving the program as you go along. We developed that in Every Man's University. It did mean that they had to discard about nine months' or a year's work because they had started out assuming people wanted things they did not get. Are these relevant to your point?

Listening Panelist: Yes, sir, they are.

Tyler: And, of course, the fourth question is who is going to pay for it? At present, the largest sources of support are from the employers, if you include the Department of Defense as the employer of the soldiers and the sailers and the others who get veteran's benefits. The employers are the largest source of support at present for continuing education. Next to them are the public support for certain sectors like agricultural extension. And the smallest proportion comes from the payment by the persons themselves for it. But that can be increased if you identify the persons who really want something strongly and can figure out a way of purchasing it at a reasonable figures. Those are problems that I do not think have been worked out, but those are problems ahead that we have to work on, because there is a real need in continuing education. And we have the capacity now that there has been no great growth in the basic student body. We have the capacity to provide for those needs.

Listening Panelist: Dr. Tyler, you mentioned the possiblity of separate schools to give opportunities for success to the gifted and the disadvantaged.

Tyler: I did not say I thought that was a new direction. I said that was an issue. Every time we have an affluent period in American history...

Listening Panelist: (interrupting) I'll ask the question before you answer! (Laughter) I want to know if you think we really need these. Do we really need these separate schools to give a chance of suceess to the gifted or the disadvantaged? Can this be managed within our communities' comprehensive school systems?

Tyler: When you look at the results of the international educational achievement program where there are tests in ten subjects for sixteen nations, you will note that the top five percent of Americans on these tests, American children and youth, do just as well as the top five percent in any other country. But in addition, we have a sector of the population that goes way down to the lowest that many other nations do not even include. Take for example, those who have mathematics at the high school level. We find people taking that representing approximately eighty percent of the high school population. They were included in our sample for testing. Japan, who made the highest scores on the mathematics examination, had only about fifty percent, and most of the other nations had much less than that, so I think the historic answer has been with our diverse schools, with schools enrolling the people who lived in that area who are able, students have learned quite well. We are continuing to increase the proportion of Americans who get Nobel prizes. In the early times when Americans got Nobel prizes, they were educated in Germany, but that is no longer true. I really do not have any basis for believing that a separate high school or elementary and secondary school for the gifted is going to help the gifted get any better, but there are lots of parents who like to feel that is one sign. They can say, "My kid is so good he can go to the Bronx High School of Science," for example, in New York where they do have such schools.

Summation by Harold Crawford:

The last thing--I heard lots of things for us to draw implications from. My list would not nearly be complete, but just to kind of serve as a stimulus, I heard a need to be concerned about the role of media. How about energy, management, decision-making, the change in the labor force, money management, the role of women, the world food or world awareness situation, population, social patterns, trust and values in the school system, continuing education, waste, and a host of others? Did you hear those? Those are the things that I heard that I think we need to address ourselves to, plus many more this afternoon, to get at the implications.

-- Edited by Richard M. Foster